

Introducing STDC: The Fastest 5" Disk Controller Available

New Card Drives Industry's Fastest Hard Disk

A new hard disk controller card, designated Model STDC, was introduced by Cromemco this month. The STDC, which can be used to drive any industry-standard ST-506 type of hard disk, achieves its remarkable speed through the use of **on-board cache memory**.

To illustrate how cache memory works, 64K of RAM exists on the STDC card itself. Of the 64K, 40K is dedicated to holding a replica of the four most recently accessed tracks on the hard disk. Since most disk read operations are sequential, this means that the controller need not access the hard disk at all for many disk read operations requested by the CPU. Rather, it retrieves the requested information directly from its own on-board cache memory. These operations are coordinated by a Z-80A processor which also resides on the STDC.

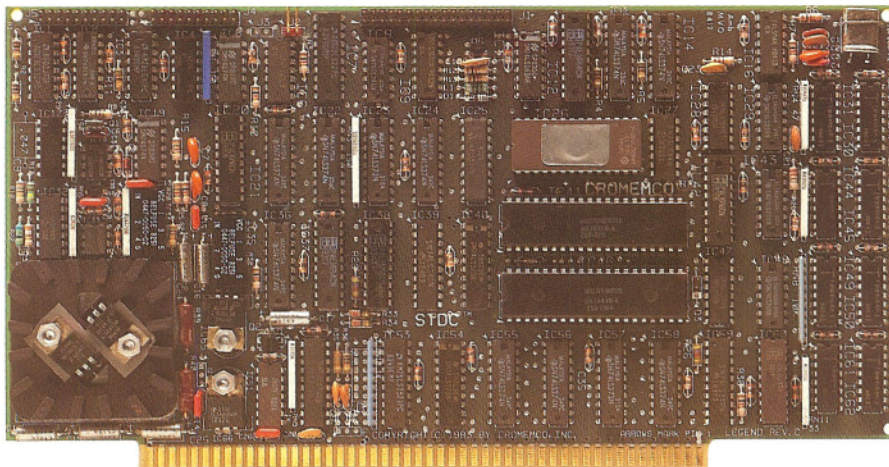
How impressive is the speed improvement which cache memory

offers over conventional designs? Typically, hard disk access times are measured in **milliseconds** while time required to read RAM is measured in **microseconds**. This translates into tremendous speed advantages in disk-intensive applications.

The STDC achieves even further speed advantages by using **DMA** [Direct Memory Access] for all data transfers. Minimal overhead for the main processor is assured as the STDC is **interrupt driven**.

Another unique feature of the new controller card is a **transparent read-after-write** operation to assure data integrity. This is achieved by reserving an additional 10K of the on-board 64K RAM as a **write buffer**. Whatever data is written to the hard disk is also stored in the buffer. After the disk write operation has taken place, the controller reads back the information and compares it with what is stored in

Continued on page 16



The STDC controller features on-board cache memory, DMA, can drive two HD-50 hard disks, and provides ST-506 interface to other types of hard disks.

A DENTAL PRACTICE MANAGEMENT SYSTEM

by Robert J. Diersing

The Dental Practice Management System described in this article is the result of approximately six months of design and testing and another two years of actual operation. It is written entirely in Cromemco 32K Structured Basic and different versions have been used under all current Cromemco operating systems. The current version of the system is best suited for use with the CROMIX operating system.

Continued on page 19

Another CROMIX SCREEN Editor

by Bob Staudenmaier

When Cromemco released its new Series 2 CDOS a few years ago, a copy of the then new SCREEN Editor was included with every CDOS disk shipped. I was delighted when I received mine. Later, I discovered the program would not work properly with my terminal because it was written for Cromemco's own 3102. Some time after that my dealer lent me a copy of a Cromemco release entitled "Modifying the SCREEN Editor for Non-Cromemco Terminals." With that, I was able to make the necessary changes.

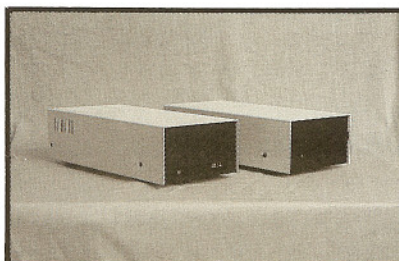
Cromemco's SCREEN Editor proved to be very fast and powerful. It was so easy to use that I never even

Continued on page 16

DISK DRIVE SUBSYSTEMS

THE SOLUTION TO DISK STORAGE PROBLEMS

16 MB 5¼" Hard Disk



5¼" Stand-alone



**CDC Phoenix and
Lark Subsystems**
(not shown)



8" Subsystem Matches System One

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FEATURES

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March/April, 1984

Volume Four, Number One

I/O News

The Official Publication of The International Association of Cromemco Users is available through membership in the association. Editorial and advertising policies are designed for the enlightenment of the members in regard to new uses for, and developments of, Cromemco products and other products compatible with Cromemco systems.

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[Soft Tips, Tec Tips, and 32K Classroom
will return next issue.]

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input...

Editor:

I'll second Wayne Watson's comment on PL/1-80 and identify myself as a PL/1-80 enthusiast. We of the Science Faculty at Helderberg College have used PL/1-80 successfully for student training despite the torture to which students can put a compiler. We find PL/1-80 to be a quality product with very few errors in the compiler. Those errors we have reported have already been corrected by Digital Research which has exhibited superior response to our comments. The quality of the product, combined with Digital Research's excellent support, have spurred me to write quite a bit of utility software for CROMIX, CDOS and CP/M systems in or for PL/1-80. It is my desire to share the results of my efforts with other IACU Members.

As I am just starting to work on plans for marketing these programs, I would be most interested to hear from other Members in order to determine what interest they may have in my software. Some of my developed packages are discussed below.

For users having difficulty locating communications software that can send and receive files containing non-ASCII data, I've written my own solution: a CP/M utility that converts files containing control characters and non-ASCII data to and from a format that contains only non-control ASCII characters (20h - 7Eh), so that ordinary utilities like CP/M's PIP, and CROMIX's TYPE or ECHO can be used to send the data.

The DUMP utility that comes with standard CP/M systems includes no ASCII interpretation. No file compare utility comes with CP/M systems. I find these indispensable. CDOS for most of Cromemco's systems comes with a good DUMP utility, and a not-very-satisfactory COMPARE feature built into XFER, but the C-10 CDOS includes neither of these. So, I've written my own in pure 8080-CP/M. I've also converted them into Z-80. The COMPARE utility is much like CROMIX's COMPARE.BIN. My utilities should fill a need for C-10 users. I also have a subroutine which CP/M programs can call to get a run-time core-dump of memory to disk (which can then be

reviewed with a DUMP utility). This is available in both CP/M and CROMIX-compatible code.

I also have a collection of utility programs and subroutines principally for CROMIX users. I should note that these subroutines can be linked to CP/M or CDOS programs, but they must then be run under CROMIX. This set includes a powerful SORT/MERGE subroutine for arbitrary fixed-length records with fixed-length keys (which I hope to make available in a CP/M version); an interface to allow COBOL and FORTRAN programs to call PL/1-80 subroutines and PL-1 to call FORTRAN subroutines (it can be used with any operating system); a utility to convert CDOS-format files to CROMIX-format so that, among other things, they can be sorted using CROMIX's SORT utility; and I am currently designing a subroutine to allow CP/M programs to issue CROMIX calls so that they can link files into the current directory, delete and rename files, have access to KSAM, and other useful things. The described subroutines have all been designed to be able to interface to CDOS COBOL (or Microsoft's COBOL-80), FORTRAN, and PL/1-80.

Further, I have a collection of miscellaneous programs written in PL/1-80 and COBOL to do such things as patching and analyzing the CROMIX log file /etc/account, generating COBOL SCREEN SECTION source code from a text-file screen image, doing almost any kind of matrix manipulation (for users of linear algebra), and converting arbitrary COBOL indexed or sequenced files to and from line sequential format for manipulating with SCREEN or WordStar, sorting, passing to or from dBASE II, etc.

As noted, marketing plans for these products are in formation, and I would be most appreciative of any feedback other Members would like to submit to me.

Sincerely,
Gerald R. Reynolds
DP Manager & Chairman,
Science Faculty
Helderberg College
P.O. Box 22
Somerset West, 7130
Republic of South Africa
Telephone: 27010



Where's Cromemco Going?

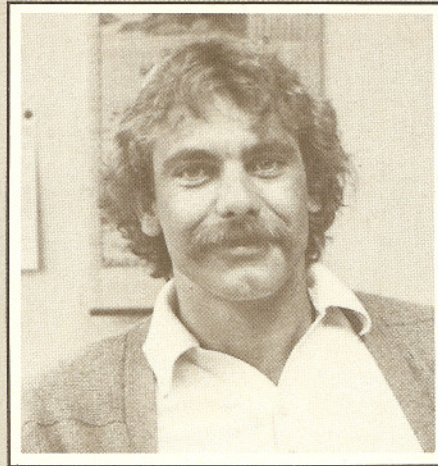
I was invited to a very special conference in April. It was a sales conference hosted by Cromemco in beautiful (but cool) Monterey, California. In attendance were all corporate officers, key individuals from the home office, as well as all regional sales and technical personnel. The entire affair was a first cabin event truly befitting the subject matter: Cromemco's future.

To recap a few points of interest, there were reports from every officer and every department head. Several new products were introduced (more about these further on), and the company's financial history and expectations were reviewed.

Starting with the latter item, Cromemco has shown a profit in each of its eight years—the only microcomputer company in the world that can make this claim. It

efforts continuing in these directions.

The new products introduced at the conference were limited to those scheduled for release in May, June, and July of this year. The May releases include the **STDC**, a new



Bill Jaenicke

hard disk controller card (detailed in a cover story in this issue), a new, **50 Megabyte** (40 Mb formatted) hard disk which is currently the fastest in the industry, and the **C-5**, a low-cost intelligent terminal which emulates both the C-10 and the 3102.

June releases include a **13 Megabyte** (10 Mb formatted) hard disk, a **revamped C-10** which incorporates Release Five (see I/O News, Vol. III, No. 6) software upgrades as well as support for eight-inch floppy disk drives and many independent printers, and **two new printers**.

Only one new hardware product was announced for July release: the **CLD**, an eight-inch, double-sided, double-density, stand-alone disk drive for the C-10 (and S-100 systems). Presumably, this is the TM-848 presently used in the System Three. It comes complete with its own cabinet, power supply and cables, and more than triples a C-10 user's storage capacity. Further, it makes CP/M programs much easier to transport to a C-10 system.

Several exciting software products are scheduled for release starting with **Informix** in May. Informix is a relational database that is destined to become to the 68000 world what dBASE II is to the eight-bit world. (See Microsystems, April, 1984, for an excellent discussion of Informix.) Bill Jaenicke is starting a

review now, and will be presenting it in a future issue.

June will be a banner month for software releases. Heading the list—insofar as old timers are concerned—is the **68000 Structured BASIC**. Existing 32K Structured BASIC programs can be recompiled under 68000 Structured BASIC. This introduces a whole new level of performance (up to 50% increase in processing speed) for 68000 users, whose current 32K BASIC applications programs utilize the Z-80 microprocessor. Even more important, the greatly expanded address space allows for much larger programs without the necessity for overlays, further contributing to increases in processing speed.

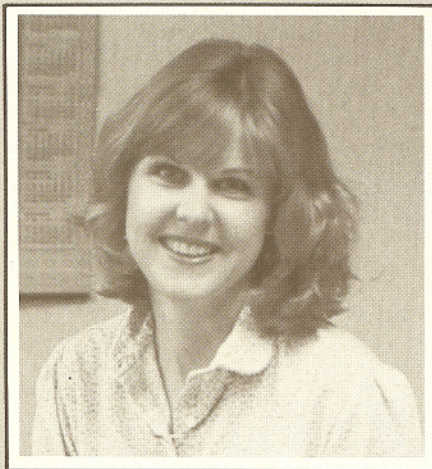
Exciting news for circuit design engineers is the anticipated release of a Cromemco version of **SPICE**. Developed at The University of California at Berkeley, SPICE is the standard and most widely used electrical circuit simulator, and is known by all circuit design organizations. It is currently in use on a Cromemco system at Texas Instruments with excellent results. Full SPICE Benchmarks will be covered as soon as available.

Other software releases scheduled for June include a new version of **TeleMaster** which includes the Ward Christiansen Protocol, **Version 02.02 WriteMaster** with several new features, and new **DEBUG** software for 68000 users, the **Symbolic Debugger**. This latter item is included free with 68000 versions of FORTRAN, C, and PASCAL languages with no need to purchase it separately. Those with software registered under the SUDS program will receive it automatically.

Speaking of SUDS, John Hulten, Director of Technical Services, reported that SUDS is now available for both Cromemco developed packages and third party packages, and that the program is more responsive than ever. It was stated by Hulten that Cromemco makes no profit from SUDS, but offers it only for the benefit of users. Once again, I'll use my editorial prerogative to urge users to register their critical software under SUDS (see "What is SUDS..." Vol. III, No. 6).

Well, those are some of the subjects introduced at the conference. We will be offering in-depth cover-

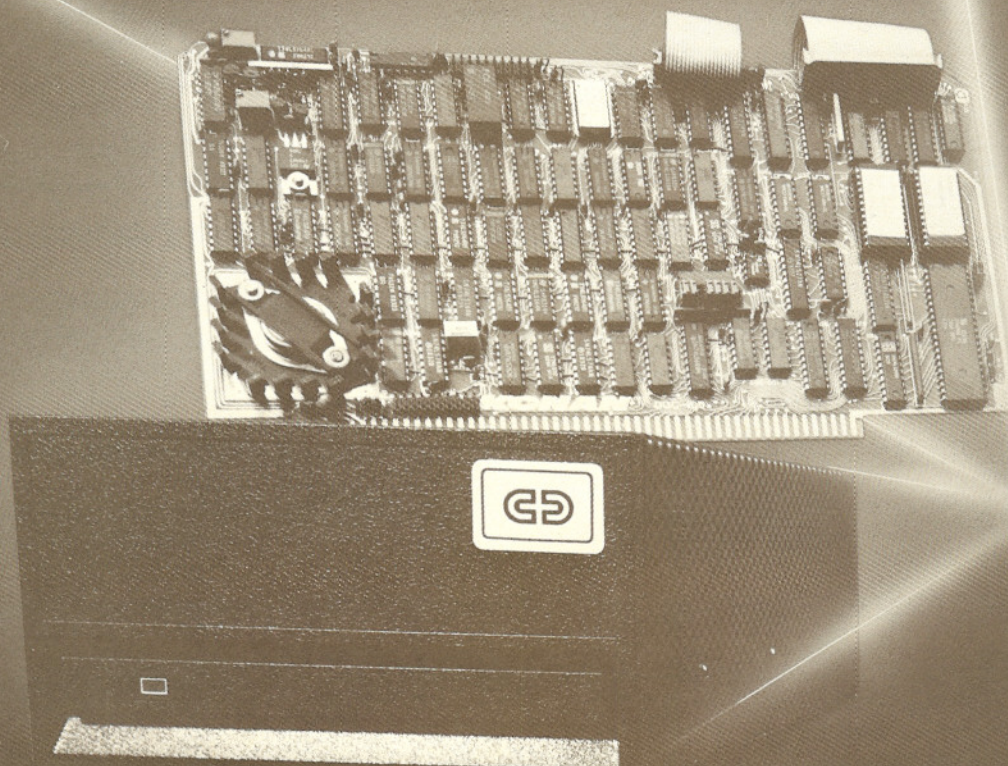
output...



Lynn Platzek

has also recorded sales increases in each of its eight years, and is shooting for \$250 million in sales by 1990. More important to users is the fact that Cromemco budgets from 8%-10% of its sales for research and development, a priority it intends to continue.

And where do these funds go? So far as we could determine, the majority will go into 68000 products and their upward successors. For the most part, eight-bit R & D budgets are for improvements to the C-10 Series. All indications point to



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* Configurations for CS-0, CS-1, CS-1H, CS-3,
and Z-2H vary from \$3995. to \$4495.

age of several of the items as soon as more data becomes available. But, one of the things it is vital to share with Members is our impression of Cromemco as a company.

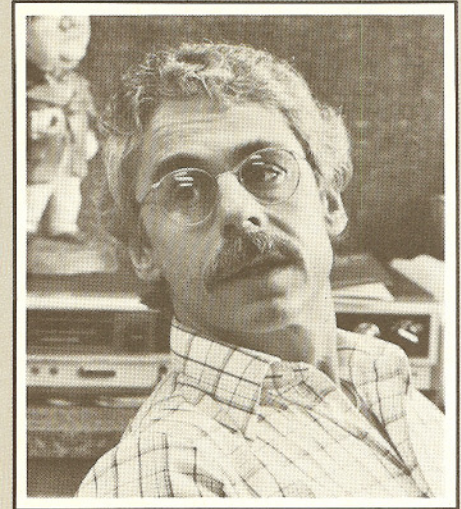
Many of the things previously handled by Cromemco's two founders are now in separate departments or divisions. Several of these are now headed by vice presidents—responsible, seasoned executives, all of whom have rich backgrounds in corporate environments. What this means is that Cromemco is making the transition from an entrepreneurial business to a mature, sophisticated company. This transition is a necessary reflection of the evolution of the entire microcomputer industry. Necessary, that is, if a company expects to prosper in the "Third Wave." And Cromemco does intend to prosper! One can see this in several areas—the maturation of the product line, the emergence of new products which keep Cromemco at the forefront of technology while never abandoning its old users, and especially through the announcement of a re-structuring of Cromemco's board. The announcement was made concurrently via the press and in person at the conference.

The speaker at our Tuesday luncheon (underscored by an earthquake which measured 6.2 on the Richter scale) was Glenn Penisten, newly-appointed Chairman of the Board of Cromemco, Inc. Penisten's credentials are impressive. He is currently (through the end of 1984) CEO of American Microsystems, Inc. (a Gould subsidiary) and is credited as being the architect of AMI's success. He is past chairman of the prestigious 2,000-member American Electronics Association, and brings both technical expertise and public sector business acumen to the Cromemco board. Penisten becomes the third principal—with co-founders Dr. Harry Garland and Dr. Roger Melen—in Cromemco. His appointment as board chairman is a strong indicator of the continued leadership of Cromemco in the field of microcomputers, and is perhaps best summed up by Dr. Garland, who announced: "Both Roger [Dr. Melen] and I were delighted when Glen Penisten accepted our invita-

tion to chair Cromemco's board. He joins us at a time when the company has just completed its eighth fiscal year with the highest sales and greatest profits in its history. Under Mr. Penisten's leadership, we expect to continue to increase in both those categories. Further, we expect his experience will contribute significantly to our long-term strategy and management development goals."

If Cromemco's goals for hosting such a conference were to enhance the image and character of the company, it worked. I left Monterey with new levels of respect for both top and middle management, and a conviction that the hardware and software introductions were made in response to customer needs. This is indeed a huge transition for a company the size of Cromemco to make, but it seems to be making it timely and positively. The

world's oldest microcomputer manufacturer is again asserting itself as the leader.



Richard Kaye
Editor

THE C-10 FUN DISK by APPLIED ENVIRONMETRICS

(National Library of Australia card number and ISBN 0 9590809 0 2)

The C-10 FUN DISK is designed as a menu driven package of games, educational programs, utilities and access to the pixel resolution graphics of the C-10. It is intended to assist the business user of the C-10 to obtain maximum benefit for his machine by providing a carefully graded set of lessons in BASIC programming and by providing a key with which to unlock the C-10 graphics. At the same time, the FUN DISK will provide amusement and education for the business person's family through a variety of games offered on the disk.

The FUN DISK menu consists of nine choices:

- 1: HELP
- 2: THE BASIC PRIMER—an introduction to the BASIC language in eight lessons.
- 3: THE BASIC TEACHER—a simple guide to programming.
- 4: CLOCK—sets and displays the C-10 clock.
- 5: Structured Basic programming language.
- 6: GALACTIC WORMS—An exciting game utilizing C-10 Graphics.
- 7: EASEL—allows you to use C-10 graphics.
- 8: Rabbit, Camel, Wumpus or Rotate ; use the Beeper or do sums. — Games programs and educational programs.
- 9: Return to System Disk.

THE C-10 FUN DISK is available for \$100 from:

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Pacific Datanet's menu-driven software makes installation simple.

Pacific Datanet's flexible segmentation scheme allows large capacity drives to function using normal CROMIX utilities.

COMPLETE SYSTEMS

Pacific Datanet's subsystems are complete. Package includes a 5 1/4" winchester, our controller, host adaptor, heavy duty 120/240 power supply, cables and software.

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Pacific Datanet makes CRC obsolete by providing real error correction.

RELIABILITY

Pacific Datanet's stringent quality control assures reliable operation.

PRICE

Prices start at \$2,795 for the hard disk subsystem and \$1,995 for the streaming tape.

For further information contact the Pacific Datanet Dealer near you or call

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2700 Augustine Drive, Suite 275
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408/980-0693
Telex: 759341

McsTAPE: A Cartridge Tape Backup System for CROMIX Hard Disks

by Bill Jaenicke

Product:	McsTAPE
Producer:	Microcomputer Consulting Services (M.C.S.) 1711 Chelsey Richardson, Texas 75081 • (214) 699-7783
Price:	\$2995
Note:	The McsTAPE unit was tested on a Cromemco Z-2D equipped with an HDD-11 hard disk drive, operating under CROMIX version 11.24.

Introduction

Some things you learn the hard way. Invariably, this applies to the discipline of maintaining current backups (copies) of important data that is kept on the computer. There are few things as devastating to the computer user as the realization that yesterday's file is gone today. It could result from a power surge or power failure, or a hardware malfunction, or because Joe accidentally erased it. Whatever the reason, if there is not a copy of that file, then it is GONE—irretrievably and irrevocably gone. Along with it went all the time and work spent in building the file.

It doesn't take many episodes like this before you learn the wisdom of keeping up-to-date backups of everything you work on. The problem now becomes one of means: how does one keep a current backup of everything. It's not so bad if you only have ten files, and those are all you use. You just make a copy of each onto a floppy disk. But if you have a 20 megabyte hard disk, with thousands of files that are frequently being changed, it becomes a very time consuming and inconvenient task to make copies on floppy disks. Fortunately, the expressed need has been answered by a product named McsTAPE. This flexible system of hardware and software, enables users of CROMIX

hard disk systems to conveniently keep the entire system backed up. And it does so with a flexibility not provided by most other tape backup systems which work under CROMIX.

The Package

The McsTAPE package consists of a cartridge drive housed in a desk top chassis (manufactured by Alloy), an S-100 interface board, the McsTAPE Utility Package (software), and an Instruction Manual.

For those concerned with appearances, the tape unit (drive and chassis) is two-tone, with a buff colored exterior and a light grey trim around the front panel. It looks good alongside the standard Cromemco black or tan/brown systems. The cartridge tape drive reads and records high density data on cartridges mechanically conforming to ANSI x3.55-1977. Data is recorded serially on four tracks. The desk top chassis houses the cartridge drive and power supply. A front panel contains the cartridge loading slot and an indicator light that indicates "TAPE IN MOTION." There is no power indicator light, nor is the ON/OFF switch marked as to which position is ON and which is OFF. This made it a little difficult to determine, after installation, if the unit was properly connected.

The S-100 interface connects the

tape drive to S-100 based systems conforming to IEEE 696. The processor must use a 4 MHz clock, which is not a problem since the Z-80 must be running at 4 MHz for CROMIX to operate properly. The interface board occupies a single slot in the S-100 motherboard. A 50 conductor cable connects the interface board to the cartridge tape drive. The cable is about 10 feet long, so it is not necessary to have the tape unit immediately adjacent to the computer system. The S-100 interface is set up for address B0h to B3h.

Software for disk-to-cartridge file backup, cartridge-to-disk file restoration, and tape directories is provided in the McsTAPE Utilities package. It is written for Z-80 and 68000 based CROMIX Operating Systems.

Specifications and Dimensions

Tape Format: (6410) 4 track serial: 6400 bpi MFM; (8310) 8333 bpi MFM

Transfer Rate: Meets requirements for 8333 bpi at 30 ips tape speed (31.32K bytes/second).

Operating Environment: +5C to +45C (cartridge limited). Altitude to 10,000 feet (3000m). 20% to 80% Relative Humidity non-condensing.

Electrical Interface: Controller to Bus — Low = 0.0 to +0.8 VDC

High = +2.0 to +5.0 VDC

Controller to Cartridge Drive —

True = 0.0 to +0.6 VDC

False = +2.0 to +5.0 VDC

S-100 Interface

Power: +8 VDC at 1.2A max.

Length: 10" (25.4 cm)

Width: 5.35" (13.59 cm)

Weight: 7.04 oz. (199 g)

Documentation

The documentation is short and concise, being only fifteen pages long. It does provide the necessary instructions for installing the hardware and utility package, as well as the operation of the McsTAPE utility program. Although each tape operation is explained, there are no examples. Consequently, the user must do some experimenting to determine the details involved with the various operations. For the most part, the operations are straightforward and require no additional information. However, those operations concerned with writing from disk to tape, and vice-versa, could be more fully explained. Some of my own observations relating to these operations are presented later in this article.

Installation

Installing the unit was a breeze. Even though I tend to be overly cautious when hooking up new equipment (triple checking everything), it only took about 30 minutes between unpacking and powering on. First, I heeded the manual's warning and unplugged the power cords from the tape drive and the computer system. Then I verified that the switch settings were properly set on the S-100 interface board (they were). I then connected the 50 pin cable to the board. Here there is room for error, since the connector is not "keyed," i.e., it is possible to put it on upside down. The manual indicates "pin 1 identifier on the cable connector toward the center of the interface board." It was simply a matter of opening the front of the computer chassis, inserting the board, routing the cable out the back panel, plugging into the cartridge tape drive, and plugging in the power cords.

I then encountered a slight difficulty: there is no power indicator lamp, nor is the ON/OFF switch so marked. So there was really no way of telling whether the unit was getting power (no fans blowing or inside lights illuminated). The only indicator light is for tape movement. I figured I would find out soon enough, after I had loaded the McsTAPE Utility package.

Installing the software is even easier. One of the utility programs (TBACKUP.CMD) expects that the

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directory /USR/MCSTAPE is present. So I created that directory (using **MAKDIR**). Then you must MOUNT the distribution disk and copy the file MCSTAPE.BIN into the /BIN directory, and the CROMIX command file TBACKUP.CMD into the /CMD directory. The manual reminds you to correctly set the access privileges for the /USR/MCSTAPE directory (this will vary from system to system depending on how groups are being used). With that, I inserted a cartridge tape, and gave the command to re-tension the tape (**mcstape -r**). The tape movement light on the front panel went on and the tape was fast-forwarded to the end, and then rewound. This simple test told me that the cable was properly connected and that I had found the ON position of the power switch. Now the fun could begin.

Operation

There are two basic modes of operation for McsTAPE: manual and automatic. In manual mode, McsTAPE commands are issued from the CROMIX operating system prompt. This mode is used for copying single files or a list of files to or from the tape cartridge. In automatic mode (more accurately, semi-automatic) the name of a file containing a list of files to backup is passed to MCSTAPE on the CROMIX command line. A separate utility, TBACKUP.CMD, is used for copying files to tape by directories, or for copying the entire disk.

In manual mode, the command structure for McsTAPE is as follows:

```
# mcstape [-irwbfdt] [filename]
```

The syntax is very CROMIX-like in that the various options are specified after a dash (" - "). These are referred to as "dash options" in the McsTAPE documentation. Usually only one option is used at a time, though there are instances where two options may be used together. An example of this is the "brief" option for the directory listing (**-bd**). When an operation is specified, such as the one to initialize a tape:

```
# mcstape -i
```

the McsTAPE banner is displayed on the screen, and the operation performed. Upon completion, the CRO-

MIX prompt is displayed. Certain options require further input from the user, such as specifying a file name, and these prompts appear on the screen after the banner. I will now briefly describe each of the various McsTAPE operations.

New tapes are initialized using the **-i** option. This formats the tape for compatibility with other McsTAPE operations. It also checks that each track's read and write circuitry is operating properly. Each cartridge has a SAFE switch that can be manually set to prevent writing to the tape (write protected). The initialization routine detects the position of this switch, and will abort the routine and display a message on the screen if the tape is write protected. As part of the initialization procedure, test data is written to the tape and then read and compared with the sample data. Diagnostics are printed if anything is amiss.

A tape directory can be displayed using the **-d** option. This will produce a list of all files present on the tape. The directory includes the track, file size and file name. At the end of the listing, a summary is given indicating the number of files on tape, the number of tape blocks used, and the total number of bytes in all of the files. The directory listing can be terminated at any time by pressing the RETURN key, at which time the summarizing is displayed for all files that had been displayed. A brief directory listing is available using the **"b"** option in conjunction with the directory operation, and produces a list of just the file names on tape, without a summary at the end. At the end of the operation the tape is rewound to the Beginning of Tape (BOT).

Writing files from the disk to the tape is accomplished using the **"-w"** option. First, McsTAPE positions the tape at the end of the existing data by searching backward from track 4 to track 1 for a track with data on it. Once the track is found, a high speed search is initiated for an End Of Tape (EOT) sequence. Once located, the tape is positioned at the next available block, and the user prompted for a file name to copy. An attempt is then made to open the file. If successful, it is written to the tape,

and the user prompted for another file name. Should the tape become full during a write operation, the user is prompted for an additional cartridge, which will be automatically initialized. Read-after-write errors are detected, and McsTAPE will make up to ten attempts to correct the error. If not, a diagnostic message is printed and the operation is aborted. This could result from flawed tape media. A new EOT mark is written after the last file has been copied.

The Read operation (**-r**) is used for copying files from the tape to the disk. When this command is issued the user is prompted for a file name. The tape is then rewound, and a sequential search initiated to locate the nominated file. If located, an attempt is made to create the file on the disk. Failure to create the file indicates that it already exists on the disk, and results in a message to that effect being displayed. Thus, existing files are not copied. This effect can be overridden by using the **"f"** option in conjunction with the **"r"** option to overwrite the existing file. Should the attempt to create the file on disk be successful, the file is then opened and the tape file copied onto the disk. Upon completion, the user is prompted for another file name. Pressing RETURN in response to the file name prompt terminates execution of McsTAPE and returns the user to the CROMIX operating system.

The **"-t"** operation is used to re-tension a cartridge tape. This should be performed before initializing a new tape, or before using a tape that has been in storage for a long time or has been dropped or jarred. When re-tensioning, the tape is rewound to the BOT, then fast-forwarded to the EOT, and then rewound to the BOT again. This operation will eliminate slack tape, which can be responsible for read and write errors.

When using McsTAPE in a semi-automatic mode, a file name is specified on the command line. This file should contain one file name per line, and can be created using a number of different CROMIX utilities (SCREEN or using the FIND utility and redirecting output to a file). McsTAPE will get its input from the file rather than from the keyboard.

For example, the command:

```
# mcstape -w rwinput
```

would write all files in the file "rwinput" to the tape. This facility makes it very easy to backup a set of selected files.

Last, but not least, the TBACKUP.CMD command file can be used for backing up all files within a directory or set of directories. The syntax for the command is:

```
# tbackup arg 1 [arg2....argn]
```

where arg1....argn are names of DIRECTORIES to backup. McsTAPE will backup all files in these directories and sub-directories. TBACKUP issues several prompts to the user to verify that the tape drive is on and that a cartridge is loaded. The option to initialize the tape is available. A hard copy of the file names to be backed up can, optionally, be printed. TBACKUP creates an input file (by way of some very clever use of the CROMIX FIND utility, and redirected I/O) which is passed as a filename to MCSTAPE. At the same time, a command file,

TRESTORE.CMD, is created for use when it is desired to restore the files to disk which had been written to tape by TBACKUP. The names of the files are displayed as they are written to the tape. If the end of the tape is reached, the user is prompted to insert another tape (one that can be initialized). Operation of the TBACKUP command file is dependent on the presence of the SCREEN, FIND, PATH, TESTINP, ECHO, L, INPUT, and TIME utilities of CROMIX. If these utilities are not present, or have been renamed, it will be necessary to modify the TBACKUP.CMD command file accordingly.

Operating Features

I was very much impressed with the overall operation of the McsTAPE system. The error checking and recovery is as nice a function as I have seen. There were numerous instances when I made mistakes, and in every case these were trapped and reported by the system. The messages displayed in these instances were always complete and descriptive, no simple statements

like "SYNTAX ERROR" that leave you wondering what you did wrong. It was always spelled out.

There is a degree of flexibility in operation not generally found in other data backup systems for the CROMIX operating system. For instance, McsTAPE supports full CROMIX file pathnames. It allows for the copying of single files, lists of files, and full directories and sub-directories, both to and from the tape. You can get a directory listing of the files on a tape. Files can span multiple cartridges. All of these are features commonly lacking in file backup systems.

With these nice features comes a price, a part of which is time. Unlike a disk operating system, for McsTAPE to provide a directory listing of the files on tape, it must first rewind to the BOT, and then sequentially move forward, listing the file names one-by-one. If the tape spans more than one track (there are four), then it must rewind before proceeding on the next track. The same is true for restoring a file from the tape. If it is near the end of the fourth track, locating the file

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prior to copying can take quite awhile, since the first three tracks are searched first.

For example, in one timed trial I backed up the entire hard disk (about 8 megabytes worth of files) using the TBACKUP command:

```
# tbackup /
```

The following table shows the results.

Elapsed Time	Actions
0:00	Specify /MYFILE as file to restore from tape.
5:44	End of TRACK 1. Not found. Rewind tape.
8:03	End rewind. Begin search on TRACK 2.
14:46	End of TRACK 2. Not found. Rewind tape.
16:05	End rewind. Begin search on TRACK 3.
22:48	End of TRACK 3. Not found. Rewind tape.
24:07	End rewind. Begin search on TRACK 4.
28:45	File located and copied. CROMIX prompt displayed.

Although it took nearly an hour for the entire operation, there was no need for user intervention. Having issued the appropriate command, and responding to the subsequent McsTAPE prompt, the system commenced its task, and successfully copied every data file on the disk to the tape, without error. Had I not been recording times, I could have gone out for a bite to eat, worked on another project—anything; all the while safe and secure in the knowledge that my precious data, to date, would survive to see another day, even if my hard disk failed tomorrow.

In another trial, I recorded how long it took to copy the last file on the tape to the hard disk. This was accomplished with the command:

```
# mcstape - rf
```

and subsequently providing the nominated file name to the McsTAPE prompt. The results are shown below.

Elapsed Time	Actions
0:00	Answer prompt. No hardcopy desired. Creates RWINPUT file and TRESTORE.CMD.
6:40	Begins initializing tape.
7:20	Initialization complete. Position tape to BOT.
7:52	Begins copying files.
17:49	Finishes TRACK 1. Rewinds tape.
19:02	Begin copying onto TRACK 2.
30:59	Finishes TRACK 2. Rewinds tape.
32:15	Begin copying onto TRACK 3.
43:44	Finishes TRACK 3. Rewinds tape.
45:03	Begin copying onto TRACK 4.
52:24	Completes copying files. Rewinds tape.
53:18	Backup completed. CROMIX prompt displayed.

In both of the preceding trials, I choose a worst case situation: copy-

ing everything, and restoring the last file on tape. Therefore, in most other uses the duration of time spent in tape positioning would not be as great. Even as it is, it is infinitely better than not being able to do it at all. As I have implied, the majority of time is spent in positioning the tape (rewinding); the actual transfer of data takes place at the rather astounding rate of 31 Kilobytes per second.

Another toll is taken, at least at first, in the possibility for confusion. Whereas a Disk Operating System will not allow multiple copies of files with the same name, McsTAPE is much more lenient. The tape can support any number of files with the SAME name. Likewise, a Disk Operating System enables you to overwrite an existing file with a different copy of the same name. Not so with the tape system: all writing to the tape takes place after the most recent EOT tape mark. Consequently, there is no way to alter any file already present on the tape, short of initializing the entire tape.

As an example of this, suppose that you had a tape on which you have systematically been backing up the file, MYFILE, whenever changes have been made to it, and at present there are three similar, yet distinct, copies of the file on the tape. When you go to restore the file to the disk from the tape (using the "rf" dash option), how does McsTAPE know which copy you want? You know that you want the most recent version, but does McsTAPE? The answer is no. When you specify the file you wish to be copied from the tape to the disk, it will locate the FIRST occurrence, do the copy, and prompt for another file name. So the file on the disk is overwritten by the first copy of the file on tape. To get the most recent version (the third occurrence of the file in this example) it is necessary to specify the same filename two additional times. Should you specify the same file a fourth time (and there are only three copies on the tape) the copy on disk is overwritten with a file containing 0 bytes (not desirable).

The confusion that can result from the presence of multiple files with the same name (would the real MYFILE please stand up), is further

compounded by CROMIX's ability to recognize both absolute and relative file pathnames, and McsTAPE's inability to do so. McsTAPE will accept a relative pathname to copy, and will create the file on tape with the relative pathname. However, should you be in any directory other than the one to which the relative pathname applies and attempt to restore the file from tape, the attempt will fail. This is because McsTAPE will be unable to create the file with the relative pathname. For example, suppose that you wanted to backup the file /USR/USERS/THISFILE, and you were currently in the /USR directory. You could specify the file to copy as USERS/THISFILE, using a pathname relative to the /USR directory. McsTAPE would create the file on tape as USERS/THISFILE. Now suppose you wanted to copy said file from tape to disk, and that you are currently in the /USR/USERS directory. McsTAPE would be unable to create the file USERS/THISFILE in the current directory, and the attempt would fail. Had the current directory been /USR, then the file would be copied since its name is a legitimate pathname in relation to the current directory.

In the entire day I spent using the McsTAPE system, I only managed to cause a problem one time. That was when I used CONTROL-C to abort the copying of files from disk to tape. Since a file was being copied at the time I aborted, McsTAPE did not have the opportunity to write an EOT mark to the tape. Consequently, the next time I attempted to write to the tape I met with dismal failure: McsTAPE was unable to locate the necessary EOT mark, and displayed a message suggesting that the tape was full. So I had to re-initialize the tape. Other than this preventable mistake, I did not encounter any operation which did not perform exactly as it should.

By the end of the day, the cart-ridge drive unit had been ON for several hours. It became quite warm: the brass cartridge slot was actually too hot to touch. In normal day to day operations, the tape drive would be on only when making backups. However, some people may prefer to leave their systems on at night, and initiate the backup process immediately before leaving

the office. In this circumstance, the tape unit might be left on continuously for several hours and the degradation of electrical components due to excessive heat would be worthy of consideration. Methods to cope with this could be simply devised: either by supplying a fan to cool the unit, or by installing a timer that would turn the unit off after allowing sufficient time for performing the backup.

Specifications and Limitations

There are a number of additional specifications and limitations worth mentioning. First, the tape unit cannot backup device files or directory names. So you should have a separate backup on floppy for device files.

As has been mentioned, it is possible for files to span multiple cartridges: McsTAPE informs you when a cartridge becomes full, and requests that another cartridge be inserted. The second tape cartridge can later be used as a stand alone tape, with one exception: if the first file on the second tape is a continuation of the last file on the first

tape, then it must be accessed from the first tape. All other files on the second tape can be accessed directly.

In order for the TBACKUP command file to operate properly, a number of CROMIX utilities must be present. These include the FIND, TESTINP, INPUT, and others which are mentioned in the McsTAPE documentation.

McsTAPE writes to the tape in 8,192-byte blocks. So even if a file is 128 bytes in length, it will take 8,192 bytes on the tape. This means that large files make more efficient use of the tape than do small files.

The approximate number of blocks (8,192 bytes) that can be written to various sizes of tapes are listed in the following table:

DC300A—300' tape; 1160 Blocks; 9.50 Meg

DC300XL—450' tape; 1740 Blocks; 14.25 Meg

DC555—555' tape; 2145 Blocks; 17.50 Meg

MCS states that they have determined the 555 feet tapes to offer the best price/performance ratio (which they can supply for \$37.50/

tape).

Lastly, linked files on the disk will be written multiple times on the tape. This is a fact to be reckoned with when determining how much tape will be required for backing up an entire disk, since the linked files do not take up space on the disk, but will on the tape. It also means, that should the entire disk have to be initialized, and then restored from tape, that none of the links will be present. Rather, a separate copy will appear in each directory that previously had a linked file in it.

Areas for Improvement

My only comment in regard to improvements would be that the documentation could be more explicit. Namely, some examples should be presented to clarify how McsTAPE handles multiple identical file names and absolute vs. relative pathnames, as was described earlier in this review.

Perhaps it would be possible to allow for a command to seek a specific track. In some cases the user might know that a desired file re-

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sides on the fourth track, and a good deal of time could be saved if there were a way to tell McsTAPE to begin searching for the file on the fourth track, as opposed to needlessly searching the first three tracks.

Summary Evaluation

In summary, McsTAPE does everything, and more, that one would expect from a tape backup system. The ability to copy and restore individual files, file lists, or entire directories is a great convenience. Although a trade-off was made with the time involved, the simple ability to do single-file-operations like this greatly outweighs any resulting inconvenience. The unit operated flawlessly throughout the trial. I know of no better recommendation than that. I only wish that I hadn't had to return the unit after completing this review.

Ease of installation	Excellent
Ease of use	Excellent
Documentation	Good
Speed	Very Good
Reliability	Excellent
Effectiveness	Excellent

*Reliability = No bugs encountered

*Effectiveness = Does it provide the benefits for which it was designed.



STDC

Continued from front cover

the buffer to assure that the correct information was written to the disk. This operation is transparent to the main CPU since an interrupt is generated only if a discrepancy is found in the comparison.

Concurrent with the release of the STDC is a new, **50-megabyte hard disk**. [When the STDC and 50-megabyte hard disk are sold as a unit, it is listed as Cromemco model **HD-50**.] The HD-50 is a fast, voice-coil type drive with an average access time of just 30 milliseconds. The high speed of this drive, matched with the high-performance of the STDC controller, makes a combination which would be a superb addition to any S-100 bus based Cromemco system.

The STDC controller can support up to two hard disks on the same system, thus giving a user an impressive **100-megabyte capacity**.

The HD-50 package will be offer-

ed as an option on all Cromemco hard disk systems. A System One, for example, with STDC, 50-megabyte hard disk, DPU processor, and 512K RAM card is designated CS1H50D5.

Cromemco will continue to offer its current 20-megabyte drive and WDI-II controller as lower-cost options for its systems.

Those of us who use Cromemco products have always enjoyed a performance advantage over less versatile and expandable systems. The STDC and HD-50 make exciting new additions to Cromemco's product line, and are timely examples of the company's tradition of performance advantage.



CROMIX SCREEN EDITOR

Continued from front cover

looked at the manual. I liked the Editor very much, but after configuring it for several other kinds of terminals I came to the following conclusions:

1) Performance of the SCREEN Editor is highly dependent on the insert and delete line functions of the 3102. Not all terminals have these features. Some terminals don't even have clear-to-end-of-line or clear-to-end-of-screen functions. The SCREEN Editor runs even slower on these devices.

2) The SCREEN Editor cannot be made to work on every kind of terminal.

3) Users accustomed to MicroPro's **WordStar** sometimes have difficulties adapting to Cromemco's SCREEN Editor.

Performance of the SCREEN Editor was magnificent on the 3102, but not on a lot of other terminals. So, I took a gamble and purchased another MicroPro product, **Wordmaster**, a SCREEN-like text editor.

Wordmaster was an excellent alternative. It was both fast and easy to use. It could be made to work on any terminal with clear screen and cursor positioning functions, and its performance was not so dependent on special terminal functions. An added bonus was that it accepted many of the commands WordStar used.

Wordmaster worked very well for me until I decided to upgrade my system to CROMIX. Cromemco included a special CROMIX version of SCREEN Editor on the operating system disk, but I found that several of the old problems remained. Wordmaster did run under CROMIX, but the screen updated so slowly I found myself falling asleep between lines.

Again, I sought a solution to my dilemma and found it in the Assembly language program I worked out, and which is reproduced in this article. The source code can be assembled with Cromemco's Macro Assembler (version 3.07 or newer), and can be patched into WordMaster version 107A with Cromemco's DEBUG. The result is an extremely high performance screen editor that can be made to work with almost any kind of terminal.

The patch works by first setting the MODE of the terminal to BINARY so that a Control-C will not abort the program. Setting the mode to binary also allows characters to be read from the keyboard one at a time rather than line-by-line.

Next, a system call is made to determine what kind of device is driving the terminal. Jumps to the CP/M BIOS entry point table (or, in this case, the BIOS entry point of the CDOS simulator) are intercepted. Control is then turned over to subroutines which perform I/O either directly, or via CROMIX system calls. Console I/O is performed independently of the CDOS simulator.

I do not yet have access to a Cromemco QUADART board, so I

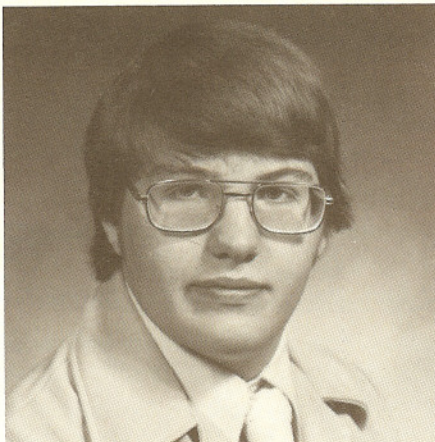
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was unable to write a routine which would access the QUADART board directly. Therefore, the patched Wordmaster will run faster on a TUART board than on a QUADART board. However, performance on the QUADART board using the TUART patch is still quite good, and definitely better than the unpatched version. Anyone who is successful at adapting this directly for the QUADART board should please contact me. Source code follows:

Editor's note: Robert Staudenmaier is currently working on two more articles. The first is entitled "Efficient Terminal Emulation under CROMIX," and the second is "Running Public Message Bases under CROMIX." He can be contacted by mail at: 1844 Crittenden Rd., Apt. 8 Rochester, NY 14623 or by phone at: (716) 475-1622



About the Author

Bob Staudenmaier is the president and owner of Starplex Microsystems, a brand new Cromemco dealership located in Rochester, New York. This is the first of several articles forthcoming from Staudenmaier. Members with questions regarding his ideas or techniques can contact him by phone at: (716) 436-8320, or by mail at: Starplex Microsystems, 955 Buffalo Road, Rochester, NY 14624.

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```
*****
;
;                                     WMCROMIX.Z80
;
;   This program contains patches to allow Wordmaster vers. 1.07 to work
;   more effectively under the Cromix Operating System. Maximum benefit is
;   obtained when the Cromemco TU-ART board is used. To install the patches:
;
;   1) Configure Wordmaster for proper operation on YOUR terminal.
;   2) ASMB WMCROMIX.Z80 HEX
;   3) DEBUG WM.COM
;   4) F WMCROMIX.HEX
;   5) R
;   6) F WM.COM
;   7) W
;   8) G 0
;
;   PROGRAM AUTHOR:  Bob Staudenmaier
;                   1844 Crittenden Rd. Apt. 8
;                   Rochester, NY 14623
;                   (716) 475-1622
;
;*****
*INCLUDE JSYSEQU.Z80
*INCLUDE MODEEQU.Z80

        ORG     100H
        JP      INIT                ;make sure init gets executed first

        ORG     1B7H
        DW      FINI                ;pointer to Wordmaster buffer space

        ORG     23C7H
        JP      USER                ;Wordmaster BIOS entry point call routine

        ORG     29B8H                ;user supplied routines begin here

PORT:    DB      0FFH                ;default port for console output

;
;   Set the terminal mode to BINARY.
;
INIT:    LD      B,STDIN              ;change mode of standard input channel
        LD      C,MD_MODE3          ;mode to change
        LD      E,^binary           ;mask for characteristics to change
        LD      D,^binary           ;value to disable control-c abort
        JSYS    .SETMODE

;
;   Now determine whether or not the console is being driven off of a TUART.
;
        LD      B,STDOUT             ;want to get status of standard output
        LD      C,ST.DEVNO          ;want device number
        JSYS    .CSTAT

        LD      A,1                  ;does console have major device number 1?
        CP      D
        JP      Z,SPORT              ;if so, jump to SPORT
        JP      0269H                ;if not, return to Wordmaster

SPORT:   LD      A,E                  ;get minor device number into accumulator
        RLC                          ;now multiply by 16 to get right port
        RLC                          ;
        RLC                          ;
        RLC                          ;
        LD      (PORT),A              ;now store proper port for WCC routine

;
;   Also, reduce the number of "dummy" CCR calls to 5.
;
        LD      A,5                  ;new number of "dummy" CCR calls.
        LD      (RESTOR),A

        JP      0269H                ;now return to Wordmaster

;
;   This set of routines is a replacement for the subroutine in Wordmaster at
;   location 23C7H. Normally, Wordmaster calls 23C7 when it wants a BIOS call
;   performed. The A register is set as an input parameter as follows:
;
;   Value      Call performed
;   0          WARM START
;   3          CHECK FOR CONSOLE READY
;   6          READ CONSOLE CHARACTER
;   9          WRITE CONSOLE CHARACTER
;
;   The A register is checked for one of the above values. If it contains one
;   of the values in the table above, the appropriate Cromix call is made. If
;   it is not in the table above, control is returned back to the subroutine at
;   23C7.
;
;
```



```

USER:  PUSH    BC           ;the registers must be saved as the subroutine
        PUSH    DE           ;at address 23C7 normally would
        PUSH    HL

;
; Check for ACCUMULATOR=3. If it is jump to CCR.
;
        CP      3
        JP      Z,CCR

;
; Check for ACCUMULATOR=9. If it is jump to WCC.
;
        CP      9
        JP      Z,WCC

;
; ACCUMULATOR=6, so jump to RCC.
;
        JP      RCC

;
; This routine does a Write Console Character call to the Cromix Operating
; System, thereby greatly speeding up Wordmaster operation under Cromix.
; (Note: If possible, WCC tries to perform a hardware dependent output
; routine to a TUART board. See program header comments.)
;

WCC:    LD      A,C           ;character must be in A, not C
        LD      BC,(PORT)    ;fetch two bytes telling which port
        INC     C             ;PORT will contain FF if not TUART
        JP      NZ,HOUT      ;jump to hardware dependent routine if TUART
        LD      B,STDOUT     ;otherwise let Cromix do it
        JSYS    .WRBYTE
        JP      IFCCCH

HOUT:    DEC     C             ;set C to TUART status register
LOOP:    IN      B,(C)         ;check status
        JP      P,LOOP       ;if not, try again
        INC     C             ;now set C to TUART output port
        OUT     (C),A         ;write the character
        JP      IFCCCH

;
; This routine does a Read Console Character call to Cromix.
;

RCC:    LD      B,STDIN       ;standard input channel
        JSYS    .RDBYTE      ;now read the character
        JP      IFCCCH

;
; This routine returns ACC=FF if a character is pending at the console.
; Otherwise, ACC=0 is returned. Since Cromix captures all the characters
; in a type-ahead buffer, it is not necessary to make this call as often
; under Cromix as under CP/M. Therefore, only every 10th call will actually
; make a real console status check. For all the others, ACC is set to zero
; and program control turned back to Wordmaster.
;

TIMES:  EQU     10
RESTOR: DB     TIMES
COUNT: DB     TIMES

CCR:    LD      A,(COUNT)    ;fetch number of times since last call
        DEC     A
        JP      Z,OK         ;OK if 25th call since the last time
        LD      (COUNT),A   ;load COUNT with COUNT-1
        LD      A,0          ;no character ready yet
        JP      IFCCCH

OK:     LD      A,(RESTOR)    ;restore COUNT to 10
        LD      (COUNT),A

        LD      B,STDIN      ;standard input channel
        LD      C,MD_STATUS  ;want to check status mode
        JSYS    .GETMODE
        LD      A,D          ;set returned byte up for comparison
        AND     ^inotempty   ;check to see if proper bit is set
        JP      Z,EMPTY      ;buffer has character, return proper value
        LD      A,0FFH       ;buffer is empty, return 0 in accumulator
        JP      IFCCCH

EMPTY:   LD      A,0
        JP      IFCCCH

FINI:   EQU     $
        END

```

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DENTAL PRACTICE MANAGEMENT SYSTEM

Continued from front cover

DESIGN PHILOSOPHY

Very often, people who are contemplating the purchase of a micro-computer for their business will decide that it is needed for word processing, payroll, or appointment scheduling. These are all important applications but they are usually not the income-producing activities. DPMS was designed to automate the income-producing and income-collecting activities of a general dentistry practice. More specifically, it automates accounts receivable billing, insurance claim filing, and production accounting.

Accounts Receivable Billing

The accounts receivable billing can be done for any time period. The system allows records to be kept during the month by patient and yet the statements can be produced with all members of the family combined into a single bill. Treatments and payments are shown along with the date and there is indication whether or not an insurance claim form was filed for specific treatment.

An inexpensive three-part form design is used. There is no pre-printing on the form. There is space set aside for a message to be printed on each statement.

Insurance Claim Forms

DPMS is designed for the practice which files insurance claims for the patient. Forms can be printed in a batch and they can be printed for treatment actually performed or for an estimated treatment plan. An important feature of the system is that of allowing mnemonic (symbolic) codes for in-office use, and for entry of data in the fewest keystrokes, which are automatically cross-referenced to ADA procedure codes when insurance forms are printed.

Production Accounting

Any good manager needs to know which activities are being done efficiently and those that may

need some attention. A dentist who operates his own office is no exception.

DPMS allows a journal of treatments and payments to be printed for any time period. It can be daily, weekly, monthly, or quarterly. The user has control of the starting and ending dates for which the journal will be produced. This report not only provides a recap of transaction detail but also provides a summary by dentist of the procedures performed during the period. Since the time spent on a procedure can be recorded, the dentist has an accurate picture of how his time is spent and how much income the time produces.

OPERATING ENVIRONMENT

DPMS started out as a CDOS implementation but is now intended for and used exclusively with CROMIX. It has been tested with both standard CROMIX and D-series CROMIX. The minimum recommended

system is one that includes CROMIX and a hard disk. Even though it is not recommended, it can be run under CDOS but some of the program features will not be available. Also, operation on a floppy disk based system is not nearly as straightforward as operation with a hard disk system.

Patient Master Files

The Patient Master File is a KSAM file and is used to hold the patient name, address, insurance company, responsible party for payment, etc. There is also an alternate key file so that the Patient Master can be accessed by either name or patient number. Dual mode of access is very handy because it allows reports to be produced in alphabetical order and yet day-to-day operations use the much shorter patient number.

The whole system is built around a four digit key and 1,000 records

DON W. DAWES, D.D.S., INC. DENTAL SYSTEM PROGRAM SELECT MENU 04/29/83

ENTER	FOR PROGRAM / FUNCTION
0	HELP WITH COMMANDS
1	PATIENT MASTER FILE
2	LIST VARIOUS FILES
3	ADA PROCEDURE CODE FILE
4	UNASSIGNED
5	INSURANCE COMPANY FILE
6	ENTER/EDIT TREATMENTS
7	ENTER/EDIT PAYMENTS
8	PRINT INSURANCE FORMS
9	TREATMENT/PAYMENT JOURNAL
10	STATEMENT SUBMENU
T	TERMINATE THE SYSTEM
	18176 BYTES MEMORY AVAILABLE

ENTER YOUR CHOICE

DON W. DAWES, D.D.S., INC. DENTAL SYSTEM STATEMENT PROCESSING SUBMENU 01/01/81

ENTER	FOR PROGRAM / FUNCTION
0	CHECK FILES FOR VALIDITY
1	CREATE STATEMENT FILES
2	UNUSED
3	PRINT STATEMENTS
4	END-OF-PERIOD PROCESSING
5	NEW TREATMENT / PAYMENT FILES
T	RETURN TO MAIN MENU

ENTER YOUR CHOICE

per file. This multiple patient master file organization allows different dentists to use different files where it is important to separate patients. As an example, dentist A could use the 1,000 file and dentist B could use the 2,000 file. The system allows a total of 8 patient master files, 1 thousand through 8 thousand. In CDOS implementations it may not be possible to have the full 1,000 records per file because of the shortage of storage for key and data block allocations.

also has an alternative key file. The alternate key file allows access to the file by a mnemonic code in addition to the A.D.A. codes. This important feature allows abbreviations to be entered in place of the 7 digit number codes and reduces the number of keystrokes needed for entry of data.

The procedure code file can be changed for all medical/dental practices. This file also holds the standard charge for the procedure and the description of the procedure.

Treatment and Payment Files

Both the Treatment and Payment files are relative record direct keyed files. The keys are stored in the patient master and the treatment and payment records themselves, thus forming a linked list of records for each patient.

The treatment file has one record for each procedure performed on a patient. Along with the procedure code, the charge, dentist number, units of time expended, hygienist number and other information is recorded.

Fields in Patient Master File:

PATIENT NUMBER: 1003
 NAME: PUBLIC JOHN Q.
 ADDRESS: 1234 ANYSTREET
 CITY: HOMETOWN
 STATE: TX
 ZIP: 78444
 BIRTHDATE: 070476
 SEX: M
 SSN: 123456789
 PHONE: 5123334444
 EMPLOYER NAME: HOMETOWN EQUIP. CO.
 ADDRESS: 5678 MAIN ST.
 CITY: HOMETOWN
 STATE: TX
 ZIP: 78433
 PHONE: 5123345555
 BALANCE FWD: 35.00
 CURR BALANCE: 55.00
 LAST HERE: 060882
 DATE LAST CR: 070883
 CONTRACT AMOUNT: 50.00
 PAYMENT DATE: 08
 RESP PARTY NO: 1003
 INSUR CO NO: 7777

A D A PROCEDURE CODE FILE RECORD

A D A PROCEDURE CODE: 0275000
 DESC ABBREVIATION: PVC
 DESCRIPTION: PORCELAIN VENEER CROWN
 STANDARD CHARGE: 378.00

The different fields in each record may be changed using a KEY WORD.

INSURANCE COMPANY FILE RECORD

COMPANY NUMBER: 0134
 NAME: AETNA (HUGHES TOOL)
 ADDRESS: P O BOX 9999
 CITY: CORPUS CHRISTI
 STATE: TX
 ZIP: 78404

Procedure Code File

The American Dental Association (and American Medical Association) subscribes to a numbering system for all procedures in the various disciplines. Since the system was implemented for a general dentistry practice, those A.D.A. code numbers are found in the Procedure Code File.

The KSAM Procedure Code File

Insurance Company File

The Insurance Company File is used to keep the names and mailing addresses of the insurance carriers used by the patients. The key to this KSAM file is placed in the patient's master file record so that the correct insurance information can be fetched when printing insurance claim forms.

(above)

An important feature of the treatment file is the ability to enter procedures which have not yet been performed. This is useful when a treatment plan has been established and an estimate needs to be submitted to an insurance carrier. As the procedures are actually performed only a code needs to be changed and a date entered.

The payment file is used to re-

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cord payments from all sources. Again, the dentist number and other information is recorded so that charges and collections can be compared.

Posting either treatments or payments causes an immediate update of the current balance in the pa-

tient master file. At the end of the billing period, the treatment and payment detail may be kept or deleted. It is not recommended to keep the detail forever because disk space would eventually be depleted. It also takes time to skip over records not needed for a par-

ticular billing period. Quarterly seems to be a good cycle for deleting treatment/payment detail. Systems without hard disk must delete the treatment/payment detail monthly.

Example Treatment Record:

PATIENT NUMBER: 1005

NAME: PUBLIC JOHNNY Q.

NUM	TYPE	DATE	CODE	TOOTH	SURFACE	DEN	HYG	TIME	CHARG	FORM
1	T	010181	EXA	AL	ALL	3	Y	15	35.00	Y

Example Payment Record:

PATIENT NUMBER: 1003

NAME: PUBLIC JOHN Q.

NUM	TYPE	DATE	AMOUNT	FORM	CHKNO	TR	DEN	NOTES
1	P	010181	35.00	CH	1234	1	3	FOR JOHNNY

SPECIMEN NOT ACTUAL

ATTENDING DENTIST'S STATEMENT

CHECK ONE:
☐ DENTIST'S PRE-TREATMENT ESTIMATE
☒ DENTIST'S STATEMENT OF ACTUAL SERVICES

CARRIER-NAME AND ADDRESS
AETNA (HUGHES TOOL)
P O BOX 9999
CORPUS CHRISTI, TX. 78404

PATIENT NAME
PUBLIC JOHNNY Q.
LAST FIRST MIDDLE
PUBLIC JOHN Q.
EMPLOYEE/SUBSCRIBER SOCIAL SECURITY NO. 234567890

EMPLOYER (COMPANY) NAME AND ADDRESS
HOMETOWN EQUIP. CO.
5678 MAIN ST.
HOMETOWN TX. 78433

GROUP NUMBER 12. **LOCATION (LOCAL)** 13. **ARE OTHER FAMILY MEMBERS EMPLOYED?** 14. **NAME AND ADDRESS OF EMPLOYER IN ITEM 13**

15. IS PATIENT COVERED BY DENTAL PLAN NAME **UNION LOCAL** **GROUP NO.** **NAME AND ADDRESS OF CARRIER**

1. HAVE REVIEWED THE FOLLOWING TREATMENT PLAN. I AUTHORIZE RELEASE OF ANY INFORMATION RELATING TO THIS CLAIM. **1. HEREBY AUTHORIZE PAYMENT DIRECTLY TO THE BELOW-NAMED DENTIST OF THE GROUP INSURANCE BENEFITS OTHERWISE PAYABLE TO ME.**

SIGNED (PATIENT OR PARENT IF MINOR) **DATE** **SIGNED (INSURED PERSON)** **DATE**

16. DENTIST NAME **17. MAILING ADDRESS**
JAMES K. DENTIST, D.D.S.
3456 MOLAR LANE
HOMETOWN TX 78434

18. DENTIST SOC. SEC. OR T.I.N. **19. DENTIST LICENSE NO.** **20. DENTIST PHONE NO.**
345678901 56789 5123456789

21. FIRST VISIT DATE **22. PLACE OF TREATMENT** **23. RADIOGRAPH OR X-RAYS** **24. TREATMENT RESULT** **25. TREATMENT RESULT** **26. TREATMENT RESULT** **27. ARE ANY SERVICES COVERED BY ANOTHER PLAN?** **28. IF PROSTHESIS, IS THIS INITIAL PLACEMENT?** **29. DATE OF PRIOR PLACEMENT** **30. IF SERVICES ALREADY COMMENCED, ENTER DATE APPLIANCES PLACED NOS. TREATMENT REMAINING**

31. EXAMINATION AND TREATMENT PLAN - LIST IN ORDER FROM TOOTH NO. 1 THROUGH TOOTH NO. 32 - USE CHARTING SYSTEM SHOWN

TOOTH NO. OR SURFACE LETTER	DESCRIPTION OF SERVICE (INCLUDING X-RAYS, PROTHESIS, MATERIALS USED, ETC.)	DATE SERVICE PERFORMED MO. DAY YEAR	PROCEDURE NUMBER	PER	FOR ADMINISTRATIVE USE ONLY
3	FULL CAST CROWN - GOLD	091983	02790	373.00	
30	DOE AMALGAM-3 SURFACE-PERM	103183	02160	75.00	
30	PINS FOR AMALGAMS	103183	02190	25.00	
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

1. HEREBY CERTIFY THAT THE PROCEDURES AS INDICATED BY DATE HAVE BEEN COMPLETED.

SIGNED (DENTIST) **DATE**

TOTAL FEE CHARGED 473.00

MAX. ALLOWABLE

DEDUCTIBLE

CARRIER %

CARRIER PAYS

PATIENT PAYS

REPORTS

Insurance Forms

When treatment, (either actual or estimated) is entered, a request can be to print in an insurance form. The system is designed to print on the standardized form for insurance claims. In-house procedure codes are cross referenced to ADA codes if necessary. After a form is printed the request code is reset.

Statements

During the statement printing process, the treatment/payment records and the patient master records are rearranged so that the responsible party receives a single statement showing detail for the entire family. Error checks are made during the statement processing where possible. For example, since a balance forward and current balance are kept in the patient master, a check is made to see if the treatments and payments processed will yield a balance matching the current balance when applied to the balance forward.

Estimates are printed if they are found in the treatment file but are not included in the balance. The first name of each family member is shown on the statement detail.

Statement form stock is de-

signed so that a stub can be kept by the office. The responsible party can keep the detail copy and the other part can be returned on the

form. The perforations normally used to remove the tractor holes are moved in to allow separation of the sections.

1087	102783	STATEMENT	BALANCE FWD	0.00	1087 SMITH JOHN	
	AMOUNT PAID	NAME	DATE	TRANSACTION	AMOUNT	123456789 8528194
	NOTE:					
DON W. DAWES, D.D.S., INC.		VIRGINIA	10/05/83	PAYMENT	-50.00	VIRGINIA 100583 -50.00
5792 WEBER ROAD		AMANDA	10/04/83	TREATMENT	22.00	AMANDA 100483 22.00
CORPUS CHRISTI, TX		AMANDA	10/13/83	TREATMENT	32.00	AMANDA 101383 32.00
78413		SHELLY	10/04/83	TREATMENT	28.00	SHELLY 100483 28.00
SMITH JOHN		CONTRACT AMOUNT	0.00	NEW BALANCE	32.00	CONTRACT 0.00
4129 MONTEGO		I THIS IS A SAMPLE STATEMENT				BALANCE 32.00
CORPUS CHRISTI, TX		I IN THIS BOX YOU CAN PUT ANY				LAST PMT 100583
78411		I MESSAGE YOU LIKE.				
PLEASE RETURN THIS STUB		DON W. DAWES, D.D.S., INC.				

Treatment / Payment Journal

The treatment/payment journal can be printed for any time period. It is usually printed daily and at the end of the billing period for the whole period and at the time when the treatment/payment files are purged. The journal provides hard-copy record of the day's transac-

tions. It also provides a record of production for which the journal is run.

The treatment/payment journal includes a breakdown of income by dentist, hygienist, and by procedure code. Comparison of income from procedures and the time expended on them is also available.

DON W. DAWES, D.D.S., INC. 04/19/82 PAGE 1
TREATMENT/PAYMENT JOURNAL FOR 04/16/82

===== TREATMENTS =====

NUMBER	NAME	DATE	CODE / TOOTH / SURFACE / DEN / TIME / ACC	CHARGE	DATE	AMOUNT	CHKNO
--------	------	------	---	--------	------	--------	-------

7632	YYYYYYYYYY						
	041682 AP2 18 DO 7 10		36.00				
	041682 AP2 19 MO 7 10		36.00				

7362	TOTALS			72.00	041682 153.00	213	
------	--------	--	--	-------	---------------	-----	--

7695	ZZZZZZZZZZ						
	041682 PVC 7 45		292.00				
	041682 N20 7 05		29.00				
7695	TOTALS		321.00		0.00		

7039	AAAAAAAAAA						
	041682 AP2 12 DO 7 05		36.00				
	041682 AP3 13 MOD 7 10		54.00				
	041682 AP2 14 OL 7 05		36.00				
	041682 FC 15 ALL 7 45		300.00				
	041682 AP1 18 O 7 05		20.00				
	041682 AP2 19 MO 7 10		36.00				
	041682 N20 7 05		48.00				
7039	TOTALS		530.00		0.00		

Sample from DPMS daily journal.

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DON W. DAWES, D.D.S., INC. 04/19/83 PAGE 3
SUMMARY BY PROCEDURE CODE FOR 04/16/82

CODE	TIME	COUNT	CHARGE	PER TIME UNIT
ALV	10	1	26.00	2.60
AP1	25	5	100.00	4.00
AP2	50	6	216.00	4.32
AP3	10	1	54.00	5.40
C2	20	2	72.00	3.60
DDX	15	2	18.00	1.20
FC	90	2	600.00	6.67
FL	15	3	15.00	1.00
N20	25	5	135.00	5.40
OHI	10	2	38.00	3.80
PAN	5	1	18.00	3.60
PPK	30	1	24.00	0.80
PVC	45	1	292.00	6.49
FXA	90	3	72.00	0.80
PKX	15	1	12.00	0.80
REC	5	1	10.00	2.00
SCC	40	2	64.00	1.60
VEX	5	1	15.00	3.00
X	15	3	30.00	2.00
TOTALS	520	43	1811.00	3.48

Sample summary by procedure code.

CONCLUSION

This system has been in use in a two dentist/two hygienist office and in a single dentist office since April of 1981. It has been used on a System 0, Z2D, Z2H, and System One 20 mbyte hard disk. Production in the offices has increased without increasing the clerical staffs. It has been noted that training of new personnel is more rapid and complete than when using previous paper and/or pegboard systems.

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How Do You Find Things?

Documents can be easily retrieved through a variety of avenues: name, owner, group, date, month, year, and keyword in either name or description.

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Let's face it, the modern electronic workplace has made information management *more* rather than less complicated. Important files, such as costly legal or contractual "boilerplates," can be unwittingly damaged. Sensitive personnel files should not be open for casual inspection.

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Is It Expensive?

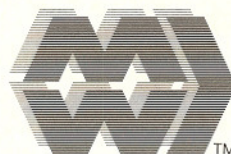
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dSPOOL

by Bill Jaenicke

Product:	dSPOOL version 5.00
Producer:	Computer Specialists & Associates (CS&A) 16691 Gothard Street, Suite G Huntington Beach, CA 92647 • (714) 841-3620
Price:	\$125
Notes:	The dSPOOL utilities were tested on a Cromemco System One equipped with an HDD-20 Hard Disk and Cromemco 3102 terminal operating under CROMIX version 11.24 (Sim.bin version 02.67) and dBASE II version 2.3B.

Introduction

dSPOOL is the generic name for a set of programs which greatly increase the capabilities of dBASE II operating under the CROMIX Operating System. dBASE II was designed for operation under single user operating systems, such as CP/M and CDOS. Within these operating systems there are no facilities for spooling, mode settings, or any of the other many features present in CROMIX. dSPOOL acts as a bridge between dBASE and CROMIX, imparting the dBASE II user or programmer with the ability to take advantage of the whole gamut of CROMIX utilities. Through dSPOOL, it is possible for dBASE to spool output to the printer, spool output to a disk file, invoke the CROMIX shell, provide system level locking (of files and or sets of files), or issue any CROMIX command that can be entered from the command line.

The Package

The dSPOOL package consists of the distribution diskette (5 inch and 8 inch available), the dSPOOL USERS GUIDE, and the CS&A Software Registration Form and Software License Agreement. The dSPOOL USERS GUIDE is also present on the distribution disk as the text file USERS.GUIDE. Software on the distribution diskette consists of an installation program (splinstl.bin) and a number of dBASE command files. The command files are dBASE

implementations (using the POKE, PEEK, SET, and CALL functions) of assembly level routines designed by CS&A. For the purpose of discussion, the command files can be divided into three functional groups: those concerned with spooling to the printer, those for spooling to disk files, and the set of general utility programs.

Documentation

It is always nice, when learning a new application, if there is clear and thorough information available to hasten the learning process. Such is the case with the dSPOOL USERS GUIDE. It begins with the software installation procedure, giving step-by-step instructions, and pointing out areas where pitfalls could occur. The dSPOOL programs are then discussed, grouped as to their general function: spool programs, spool to disk programs, or utility programs. There follows a section on special notes regarding operation; an appendix which gives a suggested CROMIX command file to be used when invoking dBASE (wherein the GETDATE utility is used to set the dBASE time from the CROMIX clock); and a list of all error messages that are returned by the dSPOOL install program.

A standard format is adhered to throughout the discussion on the operation of the various dSPOOL utilities. For each utility there is a brief description of its purpose and

use, followed by a standardized listing showing which (if any) files are used, which variables are created or need to be created, and how they are used, a list of the dBASE features used by the utility, and a list of any CROMIX features employed by the utility (such as changes in MODE settings). Examples are usually given where they prove most helpful, particularly in assigning values to variables. Thus, the operation of each utility is completely described: the user or programmer is made aware of all facets of the utility's operation, and can take this into account when using the utility, either interactively or within programs of their own design.

An added benefit arises because the documentation is also provided as a text file on the distribution diskette. It is then a simple matter to run additional copies, or better yet, to enhance or expand upon the information as it pertains to one's own special set of circumstances.

Installation

Installing the dSPOOL utilities is fairly straightforward, but there is some room for error. Basically, the installation is a two-step process. First, the distribution diskette must be mounted, and the contents of the disk copied into a directory of the user's choice. I created a directory (using the MAKDIR utility of CROMIX) called /USR/PKG/DSPOOL, and copied the files on the distribution diskette into it.

The second step involves using the installation program, SPLINSTL.BIN, which is provided on the distribution diskette. This program is responsible for adapting the dSPOOL utilities for use under the versions of the CDOS Simulator (SIM.BIN) and the system printer (/DEV/PRT) which are currently being used.

Prior to running the installation program, the documentation provides a list of items that must first be attended to. Included on this list are such things as verifying that the file DBASE.COM or DBASE2.COM is present in the /BIN directory, verifying that the device file, /DEV/PRT, exists in the /DEV directory, and that all of the dSPOOL command files are present together in a single directory. If the directory containing the dSPOOL utilities is not the current directory at the time that the installation program is run, the name of the appropriate directory can be included on the command line. For example, assuming that the dSPOOL utilities are located in /USR/PKG/DSPOOL, that the install program (SPLINSTL.BIN) is present in /BIN, and that the current directory is the root (/), then the appropriate installation command from the CROMIX command line would be:

```
# splinstl /usr/pkg/dspool
```

If all goes well, the program terminates by informing the user of success. If not, an error message is displayed indicating the nature of the problem. The problem can then be fixed, and the installation program run again until successful. The installation procedure does not alter the DBASE.COM file, only the utility programs.

It is possible that the configuration of the system may change, by getting an updated version of the simulator or by changing printer drivers. In these cases, the documentation points out, it is necessary to re-install the dSPOOL utilities before using them under the new configuration. They will not work otherwise.

Operation

Using the dSPOOL utilities is a simple matter. They are invoked, either interactively from the dBASE prompt or from within a command file, using the standard dBASE syntax of: DO [filename] where [filename] is the name of a dSPOOL utility. In the case of the spooling programs (to printer or to disk), the command files are used instead of the original dBASE print functions. This is explained further on under Operating Features.

Many of the dSPOOL utilities re-

quire that certain variables be assigned values before invoking the utility by way of the DO statement. dSPOOL performs no error checking on its own—to do so would greatly slow its operation. Therefore, the user is responsible for this aspect of the utility's operation. Failure to set up the necessary variables results in an error, generated either by dBASE or by CROMIX, and execution of the utility is aborted.

Another possible area for concern is in the naming of the variables, and in the names of the dSPOOL utilities themselves. Care must be taken that user defined variable names do not conflict with variable names created by and used by the various utilities. Because of the thoroughness of description in the documentation, there should be no problem with this. Likewise, there is the possibility that user created command file names could conflict with the names of the command files supplied on the distribution disk. Again, this possibility can be taken care of by either renaming the user command files, or, after installation, renaming the dSPOOL utilities.

The documentation points out that several of the utilities modify existing mode settings. What is not made clear is that the mode changes are only in effect while the utility is executing: they revert back to how they were when dBASE was invoked after execution of the utility is completed. At first I was concerned about this, since the Abort Enable switch is turned on when using a number of the utilities, and there was no apparent way of turning it back off. Of all mode settings, this is one that is usually disabled, since a CONTROL-C will otherwise abort execution of dBASE (at least in versions of CROMIX before 11.24 or 20.56).

Operating Features


dSPOOL offers many exciting features for the dBASE/CROMIX user. In describing these, I will present them in the same manner as they are presented in the dSPOOL USERS GUIDE, i.e., grouped by function. The three functional groups are spooling programs, spool-to-disk programs, and utilities.

There are five (5) programs which are responsible for utilizing the

print spooling feature of CROMIX. The first set consists of the two command files STPRINT.COM and DOPRINT.COM. These utilities are used in place of the dBASE commands SET PRINT ON and SET PRINT OFF, respectively. The command "DO STPRINT" causes all output which is normally sent directly to the printer to be placed in a temporary spool file. Giving the command "DO DOPRINT" closes the spool file, SETs PRINT OFF, and initiates the spooler wherein the spool file is put into the spooling queue and printed.

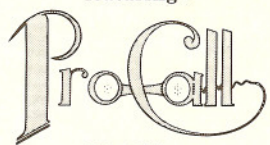
The second set of command files within this group consists of the two command files STPRINTF.COM and DOPRINTF.COM. These utilities are used in place of the dBASE commands SET FORMAT TO PRINT and SET FORMAT TO SCREEN, respectively. The command "DO STFORMAT" sets FORMAT to the printer and creates a spool file for later printing. Upon execution of the "DO FORMAT" command, the spool file is sent to the spooler, and returns the format to SCREEN.

The final spooling program is called DOREPORT.COM. It is a replacement of dBASE's REPORT...TO PRINT command. The user stores the report desired in the variable



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REPORT, after which the command "DO DOREPORT" is equivalent to REPORT &Report TO PRINT. Upon completion of the report, the spooler is initiated and the report is printed. For example, the user might give the command:

```
STORE 'FORM A FOR Field 1 < 32' to Report
```

and then issue the DOREPORT command. The advantages of being able to use CROMIX's spooler should be obvious to those who work in a multi-user environment. Under these conditions, and without dSPOOL, only one user could have access to the printer at a time.

The second set of dSPOOL programs is for printing to a disk file rather than to the printer. Again, this is a very useful capability, for it makes it possible to redirect printed output to a file, and then edit that file (using SCREEN or a wordprocessor) prior to printing out a hardcopy. The utilities ST-PRINTF.CMD and DOPRINTF.CMD work in the same manner described above for STPRINT and DOPRINT except the user must first specify the name of the file to receive the print output in the variable Filename. The filename specified can be any absolute or relative CROMIX file pathname.

Another two utilities, STFORMTF.CMD and DOFORMTF.CMD work similarly to the STFORMAT and DOFORMAT commands, except that printed output is appended to the file specified by the user in the variable Filename. The last of the spool-to-disk utilities is DOREPRTF.CMD. It works like DOREPORT except that the output file must be specified in the variable Filename.

Finally, there is the set of individual utility programs, all of which are extremely useful. The BTMMRGN.CMD utility enables the dBASE user to set the Bottom Margin of the printer. This is accomplished by assigning the desired bottom margin value to the variable Bottom, and then issuing the DO BTMMRGN command. The bottom margin remains as set until a new bottom margin is specified. When using forms, this capability is a must, since in most cases it is desirable to have the bottom margin set to zero (ignored), which is not the default mode setting for

the system printer.

The CROMIX.CMD utility will find a variety of uses, especially when developing systems in dBASE. Basically, it allows the user to issue any CROMIX command through dBASE. This is accomplished by assigning the desired command to the variable Command, and then giving the DO CROMIX instruction. For example, if you were in dBASE, and you wanted to edit one of your command files (without leaving dBASE), you could issue the following commands:

```
STORE "screen /usr/dbase/main.cmd" TO Command  
DO CROMIX
```

This would invoke the SCREEN Editor on the nominated file. Upon exiting SCREEN you would be returned to the dBASE prompt. Note that a trailing space was included in the variable assignment: this is simply a requirement of the utility, and is so indicated in the documentation whenever applicable.

The DIR.CMD utility enables the dBASE user to change current directories. The desired directory pathname is assigned to the variable Directory, and the DO DIR command given. This enables dBASE to make full use of the hierarchical directory structure of CROMIX. Two utilities are provided for dealing with dates: GETDATE.CMD and GETDATE2.CMD. GETDATE sets the dBASE date to the CROMIX system date, which is very handy with dBASE command file systems, where dBASE does not ask for the date. GETDATE2 allows the user to update the dBASE date by requesting a new date. Full error checking is done to ensure that the date is valid.

The GETTIME.CMD utility retrieves the current CROMIX time, and assigns it to the variable Time. This could be useful when it is desirable to have the time printed on a report. The time is returned in the 24 hour format of 'HH:MM:SS'.

The printer mode setting for Page Length can be changed using the PGLLENGTH.CMD utility. It is similar to MODE PRT L # in CROMIX, but does not require additional memory to operate. A variable, Length, is assigned the desired value by the user, and the DO PGLLENGTH command given. Again,

this is very useful when working with forms of non-standard length.

Another powerful feature is provided in the form of the SHELL.CMD utility. The user can gain access to the CROMIX shell simply by giving the command DO SHELL. Once in the shell, all features normally open to the CROMIX user are available. Upon exiting the shell, the user is returned to dBASE. This makes it very convenient to temporarily leave dBASE and attend to various tasks by way of the operating system, without having to leave dBASE and then reload it. It's a great time-saver.

The final two utilities, LOCK.CMD and UNLOCK.CMD, pertain to system level locking and unlocking. Locking takes place in a pure abstract form, for there are no physical limitations placed by invoking a lock. In fact, a lock is meaningless unless treated in a defined, standardized fashion whenever access to a particular group of items is requested. A lock is applied to a string of bytes (a maximum length of 16), stored in a table by the operating system. For example, to limit access to a database file, a lock can be issued for a string of bytes relating to a filename. Whenever another process wishes to access the file, it should first try to lock it. After requesting a lock via the LOCK utility, and before proceeding with the file access, it must test a variable (Lock:err) to determine if there is already a lock on the file. If not, it can issue its own lock and access the file. Otherwise, the program should inform the user that the file is locked and to try again later. This method could be extended to lock an entire set of procedures. For example, if a set of procedures accessed a group of files, a string of bytes, say "abc," could be locked to indicate that someone is currently using the procedure set. Another user attempting to use the same set of procedure concurrently would first try to issue a lock, and find that it was in use (by examining the variable Lock:err after issuing the Lock command). The program could then prevent the user from utilizing the set of procedures. In this fashion, entire groups of files could be made inaccessible with a single lock.

Although the documentation

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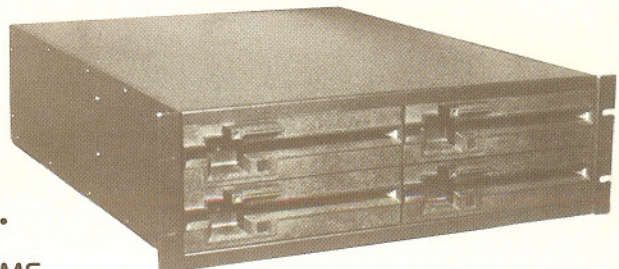
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mentions that this technique could be applied to achieve record-level locking, in practice this is not advisable. I spoke with CS&A about this, and was informed that it is impractical due to the large amount of record buffering that dBASE performs when accessing files. So in practice, if there is a possibility of conflict when two or more users access a file, it is best to lock the entire file.

The dSPool USERS GUIDE goes into considerable detail regarding the various types of locks that can be applied. Suffice to say here that locks can be issued for exclusive and unconditional access, shared and unconditional access, exclusive and conditional access, or shared and conditional access. There is a great deal of flexibility in how the user chooses to implement system level locking.

Specifications and Limitations

The dSPool utilities will work on all versions of the CDOS Simulator through version 00.67, and on versions of dBASE through version 2.4. Limitations on the use of the utilities are either limitations imposed

by dBASE or by CROMIX. In other words, dSPool does not impose any limitations that are not already present. There are other types of simulators and other custom printer drivers for which dSPool is not configured. However, I have been advised by CS&A that they will do customizations, for a nominal charge, to make the system work on any configuration. They have also expressed a willingness to design other utilities that users may find useful. That is nice to know.

Something I have yet to mention is the speed of operation. Since the programs are quite short, there is a barely discernible delay between their loading and executing. Whereas the intrinsic dBASE commands are invoked more or less instantly, there may be a pause of a second or so when using the corresponding dSPool utility. It is certainly not enough to be of concern. So for a minimal degradation in speed of operation you get a vastly improved dBASE.

Areas for Improvement

I am thoroughly pleased with the dSPool package. It provides capa-

bilities I had often wished for when working with dBASE under the CROMIX operating system. My only comment regarding improvements would be to suggest that the material in the documentation pertaining to the LOCK and UNLOCK utilities could benefit if there were a couple of concrete examples regarding their use. I found the discussion a little too general, although I eventually came to an understanding on how to use them. In all truthfulness, I have to agree with the statement made in the introduction of the documentation: "An outstanding data base package just got better." If you work with CROMIX and dBASE, this is a product you should not be without.

Summary Evaluation

Ease of installation	Very Good
Ease of use	Excellent
Documentation	Very Good
Speed	Very Good
Reliability	Excellent
Effectiveness	Excellent

- * Reliability = No bugs encountered
- * Effectiveness = Does it do what it was designed to



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bits & bytes, nibbles & tweaks

New Binders Ordered

New Binders for keeping your issues of I/O News in order will be available by the end of June. The new binders are the same size as the old ones, but instead of being orange with white lettering, they are white with orange lettering. The only other significant difference is that the new binders are noted as being for Volumes III and IV. The price remains the same, \$8.95, plus 6% sales tax for all sales within California.

NTCUG Views SPICE

The NORTH TEXAS CROMEMCO USERS GROUP May meeting, guested by Jerry Norris and Joe Walston of Texas Instruments, Inc., included a presentation on Cromemco/Berkeley SPICE Electrical Circuit Simulator software. SPICE is a general purpose circuit simulation program for nonlinear dc, nonlinear transient, and linear ac analyses. Circuits may contain resistors, capacitors, inductors, mutual inductors, independent voltage and current sources, transmission lines, and the four most common semiconductor devices: diodes, BJTs, JFETs, and MOSFETs.

A brief discussion of new products which will become available shortly from Cromemco including 68000 32K Structured Basic and a new tape cartridge backup device was also held.

CUGH Activities Reviewed

Joop Kohler, secretary for CUGH, CROMEMCO USERS GROUP HOLLAND, reports the group consists of 33 members now, varying from highly professional users to hobbyists who bought a second-hand system. During user meetings, specific implications of the different programming languages and operating systems are evaluated and special interest is given to assembler programming and a more sophisticated use of Cromemco 32K Structured Basic.

Communications between the secretary and group members is now done by sending disks. Self developed programs and command files can now be shared with other users and discussed.

Two new CROMIX workshops have begun. The first aims to develop a series of video command files for different terminals and incorporate these command files in a menu, and the second is for more advanced users and will concentrate on the use of systemcalls.

Any CROMIX Utility Wish Lists?

Computer Specialists & Associates [CS & A] would love to hear from any CROMIX users who have been wishing for any new CROMIX utilities not currently offered. CS & A, developers of dSPOOL, have a new utility disk about to be released, but are more than willing to write additional routines if other Members indicate specific needs. The disk will be available via I/O News, and will also be used in conjunction with CS & A's beginning and advanced CROMIX seminars. Send your wish lists to I/O News and we will forward them to Norman Vadnais at CS&A.

Question on Zenith Z-29 Terminal

Hans Westphal of Seattle, Washington reports that he is using his Z-29 with an 8-bit Cromemco system in the ADM3A mode, and would like to be able to use it in the ANSI mode to take advantage of the terminal's complete range of screen and cursor control features. Have any of you Z-29 users developed the necessary CDOS driver to accomplish this? If so, please send the data to Hans at: P.O. Box 48256, Seattle, WA 98148. Also, if you wouldn't mind, send us a copy of your solution so that we can keep it on file if the question arises again. Thanks.

SDS RAMDISK on System Three

Charles Rupp in Madison, Alabama recently installed a solid state disk, the SDS RAMDISK, on his System Three running under CDOS. In the process, he discovered that the software patches to CDOS became a little involved. Nonetheless, he has completed the project and now would like to make those patches available to other users for a nominal cost [he suggested \$50]. If you are in the process of doing a similar installation, you might want to save a lot of

time by using Rupp's patches. If so, write him at: Route 1, Box 241, Madison, AL 35750.

Theft Report Service Suggested

Rick Townsend, President of Computer Closet, Inc. sent us a note asking that we publish the serial numbers of some equipment recently stolen from one of his customers. The keyboard and disk drive from a C-10 [CKBA — Ser. #102416; CFD — Ser. #101478] were taken from his customer's office in New York. If either of these items should be offered for resale, please call Townsend at: 914-268-5161.

This is a subject we have addressed in the past, but it may be time to mention it again. I/O News is always willing to print descriptions and serial numbers of any stolen equipment in the hopes that such disclosure will help dissuade would-be thieves. Further, the IACU EDP Insurance Policy was instituted just because of a theft several years ago.

In the event any U.S. Members have not received the small brochure describing this policy, merely call or write us and we will get it to you. It is a solid policy at a low, group rate, available in its present form only through IACU. Please, if you are not adequately covered, look into this policy.

Praise for Horse Management Software

Randy Wright of the Department of Animal Science at Louisiana State University calls Equine Management System-III "...exactly what we need for our breeding program." We mentioned EMS-III about a year ago for anyone in the field of animal husbandry with a need for accurate breeding records, medicine administered, and financial data.

CRAMP Nears Fruition

The Cromemco cAMP [CRAMP] can only accept about ten more reservations, according to organizer Richard Quinn. It seems that his idea of a "Summer Camp" for serious, adult Cromemco users has caught on. If you want to be one of the lucky few, contact Quinn at 818-889-4819, or write him for your reservation at: QUINTEC Services, Inc., 30313 Canwood Street, Agoura, CA 91301.



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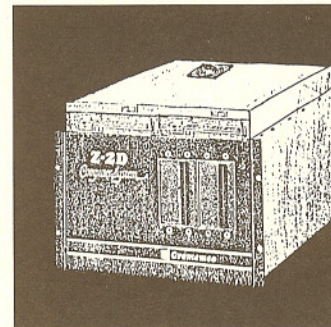
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Close Encounters of the C-10 Kind

Close Encounters of the C-10 Kind is a regular column directed to users of Cromemco's personal computer, the C-10. It is edited by Dr. Tom Beer, of Applied Environmetrics, located at 118 Gordon St., Balwyn, Victoria 3103, Australia. Dr. Beer can be reached by phone during business hours at 8180264, and at home at 8022571.

Release 4 Software

Those who subscribe to the C-10 Software Update Service [SUDS] will have, by now, received Release 4 Software along with a twelve page service note. Changes have been made to the word processor, the spread sheet, three of the utilities [chekdisk., copyfile., & copydisk.] as well as to the SCREEN Editor, the menu generator, the operating system and the demonstration program.

Most of these changes fix obscure behavior that I have never had occasion to experience. A few changes are, however, closer to home. When the system was turned on under Release 3 Software, the startup procedure would never terminate if the disk in Drive A contained MENU.COM [the menu display program], but not MENU.DOC [the menu text file]. This problem has been corrected. What has not been mentioned previously is that the startup procedure would not terminate even if MENU.DOC **was** there. My sad discovery of this condition follows:

I had developed a set of programs to teach the SBASIC programming language [which are now sold as part of the FUN-DISK] and wanted to field-test them. I transferred the teaching programs onto a new disk along with CDOS.COM, SBASIC.COM, MENU.COM, MENU.DOC and then set up a command file called STARTUP.COM which had two lines in it. The first line called up the automatic brightness adjustor; the second line started up the BASIC PRIMER [the name given the set of teaching programs]. So far, well and good. When I turned on my C-10 and inserted the disk, my eight-year-old son was ready and eager to learn BASIC. He was not disappointed. The boot and startup worked wonderfully. An hour or two later he had finished his first lesson and gave the exit command.

Then disaster struck! Instead of displaying the specially prepared version of MENU.DOC, the system graunched away displaying the cheery message:

MENU.DOC not found.

Perhaps it has been erased or renamed.

Type MENU to go back to C-10 Main Menu.

The message would flash on the screen for a few seconds, disappear, flash on again, disappear... and so on. What was so frustrating was the knowledge that MENU.DOC really was there.

Whilst my computer and I debated the existence of MENU.DOC, the realization slowly dawned that I was going to have to come to grips with the problem of turning off a C-10 in mid-graunch.

[Having written these words, I wondered whether "graunch" is in my large dictionary. It is not, so I guess that makes it my word. It refers to those obscene groans, whirrs, clicks and other noises that disk drives make. The word is an amalgam of groan and raunch.]

Page 27 of the **C-10 User Manual** sternly warns me to always remove disks before the power is turned off. However, in a different context, I had received stern warnings from Cromemco that pulling out a disk at the wrong time can do incredible damage to directory and file information. I must confess that a few times I have just turned off the power and removed a disk figuring that would be less damaging than removing a disk while it was being accessed by the computer. It seemed not to harm the disk, but it engendered immense guilt feelings, and I worried a great deal about other alternatives. Finally, I hit upon a perfect solution.

The sequence, CONTROL-SHIFT-L, puts one into local mode. Local mode stops whatever the computer is doing and allows your key-

board and your screen to have a jolly time communicating directly with each other. The operative words are: STOPS WHATEVER YOUR COMPUTER IS DOING. By pressing the red CONTROL key, and while continuing to hold it down, pressing the SHIFT key, and then while continuing to hold both down, pressing the L key, the disk drive stopped graunching and fell into a blessed silence. I then removed the disk and turned the power off. I have to use the same trick when I want to stop a dBASE II program, as the ESC key does not seem to do the job.

WORD PROCESSING

Whilst my wife was using the Release 3 word processing package, she discovered that most of the fancy options described in Chapter 15 of the WriteMaster manual did not seem to work. After playing with the system for awhile, I finally deduced that the fancy options still did work, but that in going from Release 2 to Release 3 someone had altered the key codes that triggered these fancy options. This has not been corrected in Release 4, so I have worked out the new codes. The table below should replace the left hand side of Figure 15-3 which appears on page 281 of the WriteMaster manual:

ANY CHAR(f1)	CONTROL-1 (Unchanged)
ANY SEQUENCE(f2)	CONTROL-SHIFT-1 (Unchanged)
SET SEARCH(ALIGN)	CONTROL-SHIFT-@ (New)
USER SET(f4)	CONTROL-SHIFT-2 (Unchanged)
LETTER(CENTER)	CONTROL-SHIFT-1 (New)
DIGIT(MOVE)	CONTROL-6 (New)
PUNCT(COPY)	CONTROL-SHIFT-6 (New)
NOT(END PAGE)	CONTROL-SHIFT-5 (New)
CAPS OR LOWER(CASE)	CONTROL-SHIFT-7 (New)
SPACE bar	(Unchanged)

I may add here that whilst I found this all good clean fun, my wife was reduced to tears and has vowed never to try anything more difficult than editing a file and manually inserting changes. I do not envy the manufacturer's task, but when trying to sell software to computer illiterates an uncorrected bug of this magnitude is a gigantic step backwards.

Release 4 word processing has one improvement that I was delighted to see. In earlier versions, an inadvertent press of the ESC key would be cancelled by another press of the ESC key. At which

stage, the screen would redisplay starting at line 1 and working down to line 24. This took time. One of my most common errors while using WriteMaster is to press the ESC key instead of the CONTROL key when attempting to use the functions. The bad part of this is that I continue to hold the ESC down while waiting for things to happen. The computer interprets this as a succession of commands followed by cancellations. I have had many a very long wait while the screen keeps redisplaying itself as it works through all the times it thinks I intended to press the ESC key. In Release 4, only line 1—the command line—changes on an ESC-ESC sequence.

The command line of Release 4 WriteMaster now carries the name of the file being edited, and the column, line and page of the cursor location. This is very useful information, but it slows the operation of the system considerably. I am not a particularly fast typist, but I noticed there were occasions when the software had trouble keeping up with me. I suspect really fast typists may want to use one of the earlier releases for creating documents, and reserve Release 4 for editing extant work.

I still notice that "ghost" lines or letters occasionally appear during a WriteMaster session. These are lines or letters that have appeared as a byproduct of a command have not been typed in, and should not be there at all. The **Redisplay Text** function key [CONTROL-SHIFT-^] seems to be the quickest way of exorcising these particular ghosts.

GRAPHICS

In I/O News [Vol. III, No. 4], David Paulos queried the advertised pixel [160 × 172] and line [720 × 384] graphics of the C-10, and wanted information as to how to access them. Both these counts seem to be wrong. The pixel graphics are 160 × 72 and are achieved by dividing the 80 × 24 standard alphanumeric pixel into 2 × 3 sub-pixels. For all practical purposes, this constitutes the full graphics resolution of the C-10. You would, however, have to be possessed of sophisticated wizardry to achieve it. The bottom right pixel of the screen always gives a gratuitous line feed when it is accessed and is thus use-

less for anything but text scrolling. The pixel graphics can be accessed through Structured BASIC. It is not easy, but it can be done.

The claim of 720 × 384 for line graphic resolution, which I have seen reproduced in reviews of the C-10, must be incorrect as the pixel character cell is eight dots wide by nine lines high. Thus, even if we include the status line, there can never be more than $25 \times 9 = 225$ horizontal lines available. The figure of 384 is impossible.

The line graphics offer limited utility, mainly used for underlining. Simple graphical tasks such as drawing rectangles can be done, but requires tortuous programming. If you do have such masochistic tendencies, use SBASIC as your programming tool.

The only graphics program for the C-10 of which I am aware is EASEL, which is one of a group of programs supplied on the **C-10 FUN DISK**. It provides access to the pixel graphics only, and stores the resulting picture in a file. On the FUN DISK, the picture is stored in EASEL.PIX when EASEL is called from the MENU. If you want to save a picture for posterity, you should

either rename EASEL.PIX something else, or bypass the menu and issue the command EASEL STORE.PIX, for example, to store the picture in a file, STORE.PIX.

Speaking of the FUN DISK, it can be ordered from Applied Environmental, 118 Gordon St., Balwyn, Victoria 3103, Australia. It retails for \$100 [U.S.] and offers a complete package of games, educational programs [the BASIC teaching program mentioned above, as well as a more advanced set of BASIC lessons], utilities, and the EASEL.

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Inside CROMIX

William E. Jaenicke is an independent software consultant and president of SASi (Satellite Accounting Systems, Inc.). In addition to the SASi General Ledger, his firm also developed QTS, a time-keeping and time management report package for professionals. He has been working with Cromemco systems for more than four years, including almost three years of experience with CROMIX. Jaenicke holds regular monthly seminars on CROMIX in his Newport Beach, California offices. He can be reached by phone at (714) 955-2220.

Editor's Note:

User's are encouraged to submit their findings regarding the working of CROMIX so that they may appear in INSIDE CROMIX for the benefit of all. This will ensure that there will always be fresh and informative material.

USE OF DEVICE NAMES IN CROMIX

by Mark Byrd

I have noticed in recent I/O News articles that some readers may not be aware of a feature of CROMIX that makes life a little easier. Instead of using tty1, tty2, slpt1, etc., which are just arbitrary device names SUGGESTED by Cromemco, these names can be linked to REAL names that have some meaning. As an example we have two printers: a NEC Spinwriter letter quality and a TI-820 line printer. These printers have traditional names in the device directory such as SLPT1 and SLPT2. However, they are also linked to two names called NEC and TI-820. This allows referencing these device names for shell commands and spooling by using /dev/nec or /dev/ti820. By using this method we don't have to remember which device name goes with which printer.

We also do the same thing with the consoles and the modem. By assigning the names of the user to the terminal it makes it easier to remember who is using which terminal. Notice that the device names SLPT1 and SLPT2 are NOT the names one would expect for the corresponding MAJOR:MINOR numbers. There is nothing that says device 7:6 MUST be SLPT4. We ALWAYS assign the first device (i.e.: printer) to the first device name (i.e. SLPT1) regardless of the physi-

cal MAJOR:MINOR numbers.

Also notice that all devices that are not attached to our system have been removed from the device file. This eliminates the possibility of referencing a device that is not on the system and causing the system to lock-up.

One last thing is that we DO leave the NORMAL names such as SLPT1 and SLPT2 in the device directory and use the MAKLINK utility to create the additional names. This allows us to quickly determine what TYPE of device driver is associated with the REAL names rather than having to remember the MAJOR:MINOR numbers. (i.e.: SLPT1 is a serial device driver connected to the TU-ART using the busy bit protocol. By looking at NEC it would be more difficult to figure this information out.)

=====

Listing of /dev to show the linkage of REAL names to ARBITRARY names

```

1:0  C 3 console
1:1  B 1 fdb
2:0  B 2 hd0
1:0  C 3 mark          <----- Same as tty1 and console
1:2  C 2 martha        <----- Same as tty2
1:5  C 2 modem         <----- Same as tty3
7:7  C 2 nec           <----- Same as slpt1
3:0  C 1 null
7:70 C 3 prt
0:0  B 1 root
1:4  B 1 sfda
7:7  C 2 slpt1
7:70 C 3 slpt2
3:1  C 1 smem
7:70 C 3 ti820         <----- Same as slpt2
4:0  C 1 timer
0:0  C 1 tty
1:0  C 3 tty1
1:2  C 2 tty2
1:5  C 2 tty3

```

=====

Listing of /etc/ttys to show how the reference can be used

```

1:n      :mark
1:9600   :martha
0:1200   :modem

```

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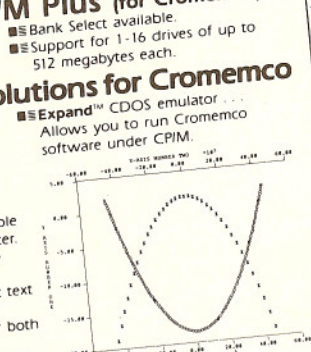
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Effective October 1, 1984, membership rates in The IACU will experience their first increase since the organization was started in the Summer of 1980. But, in order to protect existing Members, it will be possible to renew FOR EXTENDED PERIODS at the original rates.

It is important to stress the "extended periods" part of this announcement as the previous policy was to accept memberships for only up to three years. Approximately half of the Members have taken advantage of multiple-year member-

ships, to date. Now, even those with multiple-year memberships will be able to extend them at the old rates.

To illustrate, suppost one joined in 1983 with a three-year membership. That would leave two years [in our example] to run before renewal would normally be considered. The extended period policy allows a Member to renew for up to an additional three years, for a total of five more years, at the original membership/renewal rates.

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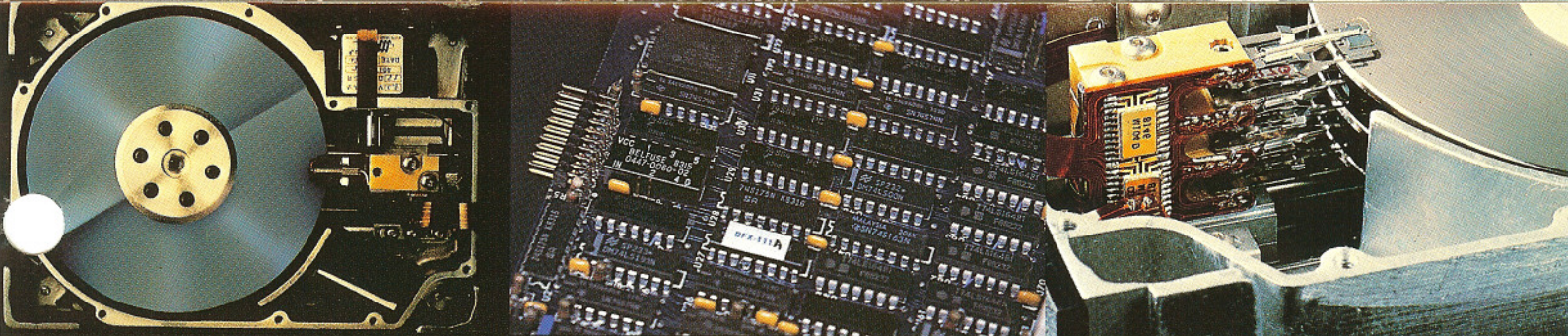
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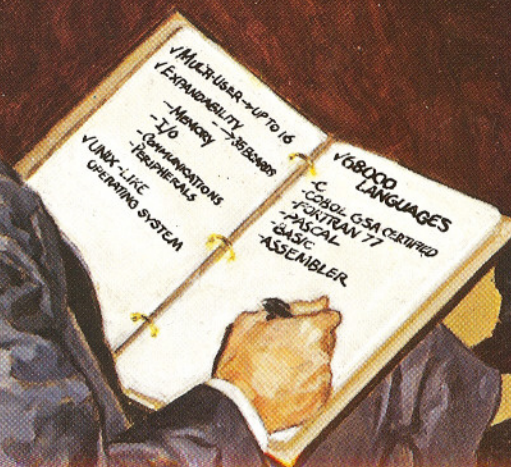
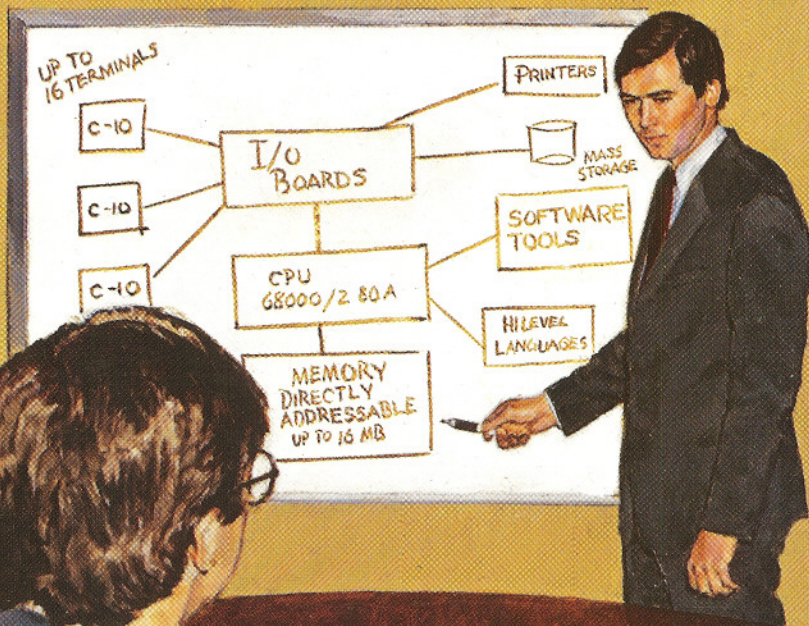
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